

THE AMERICAN MUSEUM JOURNAL

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MARY CYNTHIA DICKERSON, *Editor*

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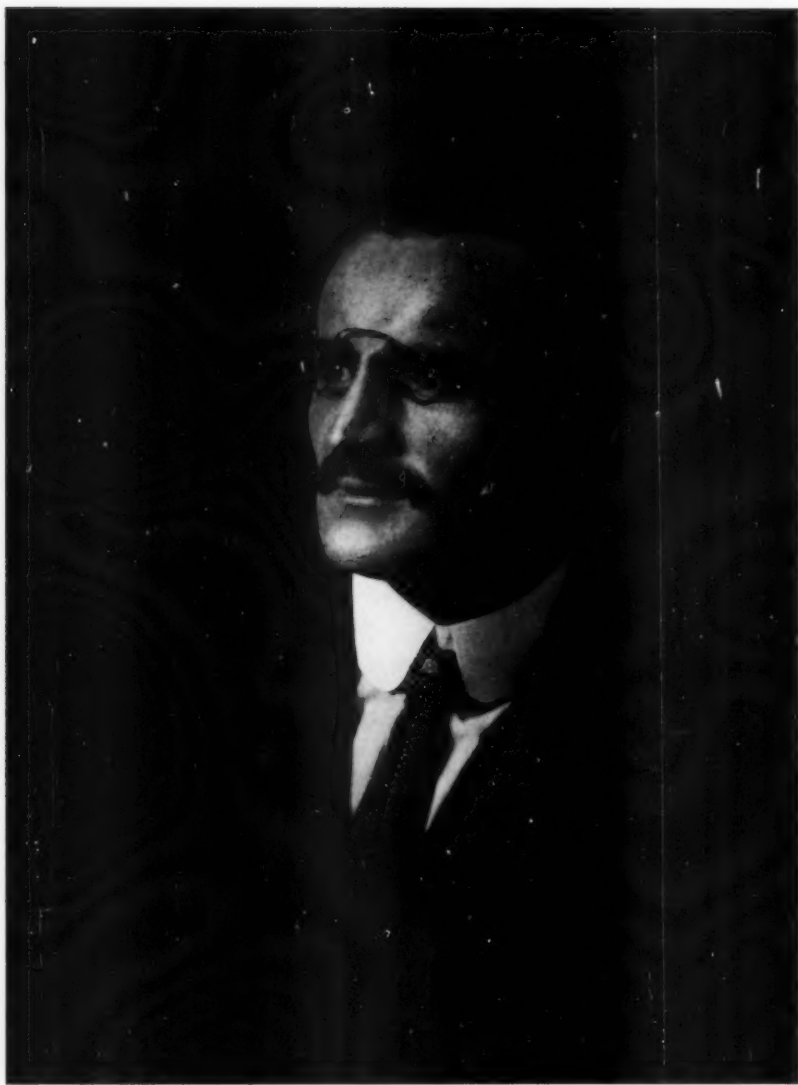


Photo by DeWitt C. Ward

MR. HERBERT LANG, LEADER OF THE
AMERICAN MUSEUM'S CONGO EXPEDITION, 1909-1915

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AN EXPLORER'S VIEW OF THE CONGO

By Herbert Lang

Illustrations from photographs by the Author

The history of the Museum's work in the Congo is well-known to JOURNAL readers.¹ Mr. Herbert Lang, leader, and Mr. James P. Chapin, assistant, have carried the Congo expedition successfully through more than six years' work in Central Africa. The expedition was organized in 1909 on a tentative basis of three years' work and was supported by the contributions of the following men of New York: Messrs. John B. Trevor, Charles Lanier, Cleveland H. Dodge, J. P. Morgan, Jr., William K. Vanderbilt, A. D. Juilliard, Robert W. Goellet and William Rockefeller. An extension of time for the work, in order to complete a zoological survey of the unexplored territory, was made possible through the Jesup Fund of the Museum.

Mr. Lang and Mr. Chapin have now returned, and the large and splendidly preserved collections with their valuable data, ready for extensive scientific research as well as for the construction of habitat groups for exhibition, have reached America and are safely housed in the Museum buildings. The following article by Mr. Lang on the natives of the Congo, is authoritative in that it is based on a six-years' intimate acquaintance with natives of many tribes and a six-years' first-hand knowledge of conditions in the Congo.—THE EDITOR

GR^EAT progress in civilization unfortunately often seems to be accompanied by incidents which throw some gloom on the result. At the time of the Belgian occupation of the Congo Basin no other power coveted this particular piece of territory. Practically all of its inhabitants were cannibals, a large portion had been laid waste by Arab slave-traders and by the Mahdists, and the country certainly deserved its reputation of being one of the most unhealthful regions.

Other European nations had had plenty of opportunity to carry the torch of progress into the swampy regions of darkest Africa, but the possession already by these colonizing powers of really prosperous colonies seems to show that political, financial and commercial advantages were preferred by them to what they probably considered a glori-

ous but venturesome task. The Congo was therefore left to the King of the Belgians. Nor would it have been advantageous to continue to abandon its natives to the Arab slavers with their indescribable atrocities; to the Mahdists, who had already left a large and once prosperous section of Africa in a nearly desert condition, and to the horrors of the internecine warfare which is the inevitable sequel of cannibalism. It was well that some power should undertake the civilization of the natives even though difficulties and misunderstandings might ensue.

If there had been (as some critics of the government seem to infer there were)

¹ The full story of the aims of the expedition and its start from New York on May 8, 1909, is told in the JOURNAL for October, 1910; various brief articles regarding the work in progress have appeared at intervals between that date and the present.

vast numbers of noble-minded and well-equipped men available for this task, progress would undoubtedly have been easier; but most men were deterred by the dangers and discomforts, and those offering their services were naturally of an adventurous and independent character. In many cases it proved to be a question as to whether the King of the Belgians could accept the responsibilities that naturally were connected with the services of such people, because positions in the Congo in those early periods often meant full autocratic power, with very little immediate control by superior officers. In the greater part of what has been written however, about the Congo and its administration, these initial difficulties are overlooked and more criticism than praise has been bestowed. Men of high distinction and indubitably noble sentiments have enrolled themselves in the campaign against this administration, in perfect good faith and in the belief that they were rendering a service to humanity.

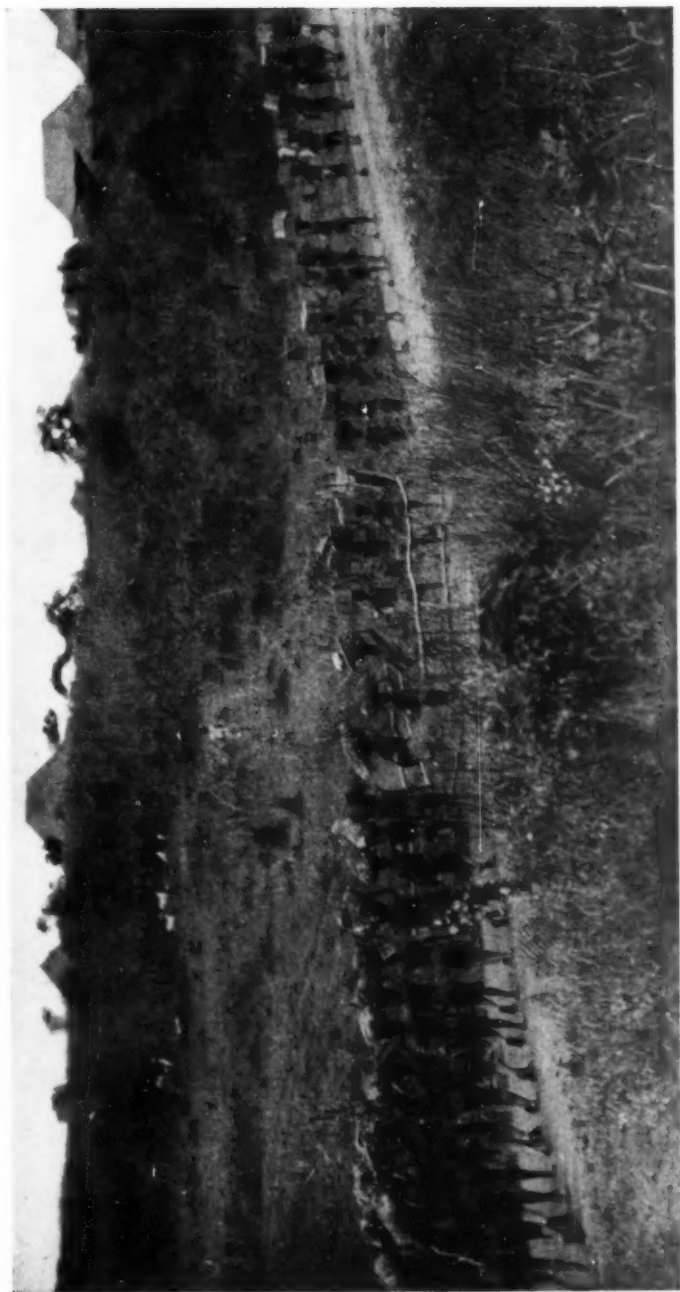
The greatest reproach—the matter which seemed to arouse unlimited criticism—was the collecting of rubber by natives in payment of their taxes, and the stories of the horrors connected therewith. There is no doubt at all that the sale of this rubber netted some very handsome financial gains, and certainly honest criticism was much needed at one time in order to correct the methods employed by some of the administrative officers, who were naturally anxious to show what they considered high ability in administering their territories; or to put it correctly in just these faulty cases, in ruling what they considered their own little kingdoms.

What was needed however was not a campaign against atrocities, but an honest effort toward improving certain conditions so as to induce a larger num-

ber of men of a higher type to live in the Congo. These might have devoted themselves actively to civilizing efforts, and by their very presence a change in defective conditions would have been brought about without causing embitterment. As a matter of fact, if the well-being and civilization of the natives alone are to be considered as the ultimate object of conquest, there are few portions of Africa which have a higher record for truly remarkable advance than the Belgian Congo itself; but the impetuosity of the unfortunate campaign of the reformers is responsible for producing a number of laws of such great leniency that the strong and successfully guiding hand is often stayed by inappropriate measures, which positively injure the general welfare of the natives. Some of these laws actually seem systematically to encourage degradation by openly encouraging idleness, although the negro would be perfectly willing to contribute his share to the progress and elevation of his race, which will probably never be attained except by giving him a fair chance for useful work and by establishing correct compensation.

This unsatisfactory legislation indeed, seems to have been the chief result achieved by the agitators, whereas if we consider the Belgian Congo as a whole, with a view to determining what great reforms have benefited the natives, we find that it is to the Belgian government that they are essentially due.

The natives of the Congo like meat, and from all we saw they enjoy a marvelous digestion. They have been called by opponents of the government "poor defenseless children." As a matter of fact there were eleven millions of cannibals, who in a single day probably killed for mere food purposes more of their unfortunate fellow-men than the number laid by these critics at the doors of all



COLLECTIONS OF THE CONGO EXPEDITION STARTING THEIR LONG JOURNEY TO NEW YORK

Caravan of a hundred porters leaving the post of Faradjé. Government officials courteously arranged for transportation of the loads from post to post by relays of black porters in charge only of a native assistant. They walk ten to fifteen miles a day carrying a load of sixty pounds each. It is a fact of much interest that out of the 1287 loads carried over a distance of fifty days' portage with only occasional supervision by white men not a single load disappeared or met injury. This is suggestive of the satisfactory government administration and of the state of contentment among the natives



Old Mobali man. The hair is allowed to grow long in age; the young men wear it shaven or short

the trespassing government officials together. Even their dead were often sold to neighbors to satisfy the hunger for meat. Incidentally this horrible



Azande woman. The headdress is made of human hair, woven upon a framework of rattan and decorated with cowrie shells

practice produced some fairly good results in eugenics, as in many tribes weakened people or crippled children helped to nourish their more sturdy brothers.

From the very start the government stopped internecine war and cannibalism; invited professional reformers; made traveling through these regions practically safe; established a system of river navigation; drove out slave-traders and Mahdists; introduced an elaborate judiciary system, and built in spite of apparently insurmountable difficulties, a two-hundred-and-forty-mile railroad near the coast belt, which really meant the opening of the Congo to the world at large.

For over two years we lived in a district where, at that time, probably greater quantities of rubber were being collected by the natives than in any other region of the Congo. We often received specimens for our zoölogical collections from these rubber caravans which entered the forest for a week or a fortnight. In fact they considered us rather as friends and thus we had ample opportunity of seeing them at work. Only a few remarks are necessary to throw light on the general conditions as we observed them.

Long ago, when cannibalism was still flourishing, these negroes always left between the localities of the principal tribes large, uninhabited belts in the forest, so that the chance of continued or immediate invasion by their ever-hungry neighbors might be slightly reduced. This belt was naturally also the hunting ground, as in such a reservation game was fairly abundant, and not many natives would dare to venture alone into this wilderness. At certain periods however, two or three times a year, the great chiefs would collect their natives and would enter this uninhabited forest-belt, either to gather household necessities

or with the intention of organizing a raid upon the villages beyond. They often formed caravans of several hundred individuals — men, women and children — carrying everything for the necessities of life with them, most of the men of course being armed with spears and arrows. No halfway respectable negro would leave his wife in the village. Even the chief's more important women would have considered it a disgrace if they had been compelled to stay at home. Naturally the children were only too glad of an outing and no mother would leave her youngster behind. The forest supplies these negroes with everything their small plantations are unable to provide: building and household material; meat to be dried over the fire; the hides of game; plants for medicines; a great many charms; in fact everything they cannot find in the neighborhood of their villages, where they have usually cut down the forest.

Rubber collecting is exactly the same kind of occupation as this other collecting, only it excludes all raids. There is not the slightest change, except that the natives add rubber to all the other things they gathered before. The remuneration given by the state at the time we entered the Congo was still in trade goods of excellent quality. In 1910 the natives, in spite of delivering this rubber as taxes, received more for it than later in 1914 after the introduction of currency, as the price of this commodity had then dropped in the European market. When we passed through the same region again the natives openly complained that the commercial agents paid even less than the government officials formerly.

Before the advent of the government these natives had to work much harder, as a result of the continued destruction brought about by internecine war. Villages were burnt down and plantations



A "Parisienne" of the Mangbetu tribe. The head is bound with a fine cord made of raffia, banana fibre or hair, while the natural hair is woven into a frame of rattan fibre. This toilet takes two days to perform

destroyed and the men had to rebuild and replant and always to keep them-



Makere woman. The concha of the ear is cut out as a tribal mark, and a bone pin is worn through the nasal septum

selves fit for fighting. After the pacification of these regions, which actually contained so many able-bodied men, it was surely better that they should be intelligently organized so that their unemployed energies might serve the progress of civilization, than that they should be left to drunkenness and sloth. In most of the districts there was nothing of value but rubber and ivory, and the natives were put to work to collect some of the rubber. They prefer this work to portage or road-making, which latter they consider a woman's occupation.

The freedom of trade and the introduction of currency could hardly have been brought about more rapidly. In many districts however, the first arrivals

representing this freedom of trade were of the most ordinary class of adventurers, who considered the native but an object for their greed. The wisdom of withholding these people so long was abundantly apparent, for only the confidence which the government officers enjoyed among the natives saved the lives of some of them. These natives are rather independent in their decisions and rash in action.

To-day the country is well policed; the natives are — or at least were before the war — perfectly peaceful, and in our six years among them we never saw a single atrocity. Fortunately the position of the lower administrative officers has been rendered much more attractive,



Pygmies from Nala, in the Uele District. They live by hunting, and exchange their spoils with the agricultural tribes for vegetables. Two hundred of them visited the expedition and many allowed plaster casts to be made of their faces



The pieces of iron in the shape of spearheads represent currency and, together with the dog and lumps of crude iron, constitute the man's offering to the parents for his bride. The chief of the tribe, in public palaver, decides as to the justice of the bargain

and now most of the men engaged look upon their more stable position with satisfaction. This alone does away with irresponsible actions and the increased comfort and security tends greatly to minimize the dangers of the dreaded Congo climate. Many of the local disturbances in administering the native population have been due to the temporary illness or general indisposition of European officers, who on this account were unable to show that high degree of patience and firmness which the successful handling of these natives requires.

The latter express themselves as fairly content, comparing past times with the present. Only one blessing they still covet, "The remedy to avoid ultimate death." They have not the slightest tendency toward philosophic speculation, nor are they capable of attaching themselves readily to purely spiritual

beliefs. Their happiness or safety depends, according to their idea, upon all sorts of conditions or objects which, like a talisman, are supposed to possess powers of preventing mischief or disaster. So imbued are they with these superstitions that death, with all of them, is not the final and natural destruction of life but the result of witchcraft.

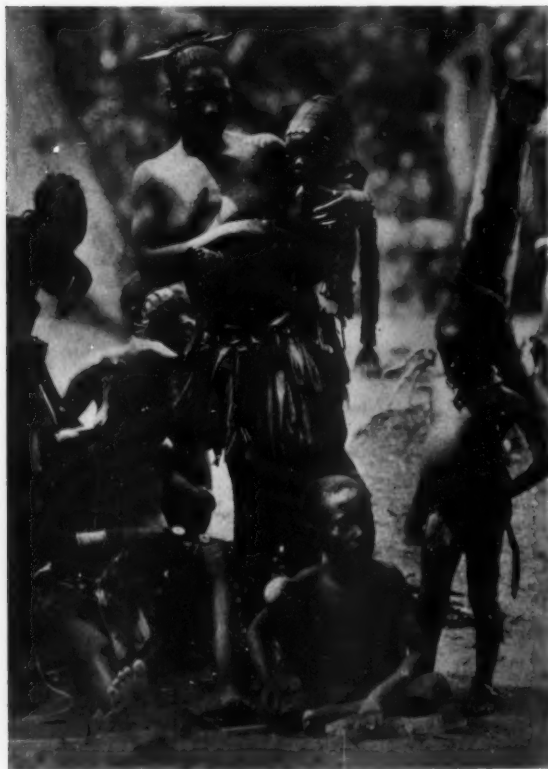
Those who know the natives well never doubt that their faith is infinitely stronger than that of many Christians. Their superstitions are more than a belief. These superstitions often represent stern laws the very cruelty of which frightens them away from wrong-doing. This is the rock of salvation for reform.

These natives sometimes kill their fellow-men without what may be called a trial, but it is only a few hundred years since white men killed thousands of their brethren simply because they had a dif-

ferent faith or conviction, and it is only to-day that they recognize that the defective organization of society is responsible for many criminals. None of the natives indulge any longer in cannibalism; yet those most anxious to help them, and many of the professional reformers,

They are not necessarily degraded because they enjoy life according to their own standards, which in essentials do not differ so very widely from those of civilized people; nor because they are capable of living well on native food without silverware or china. It is true that

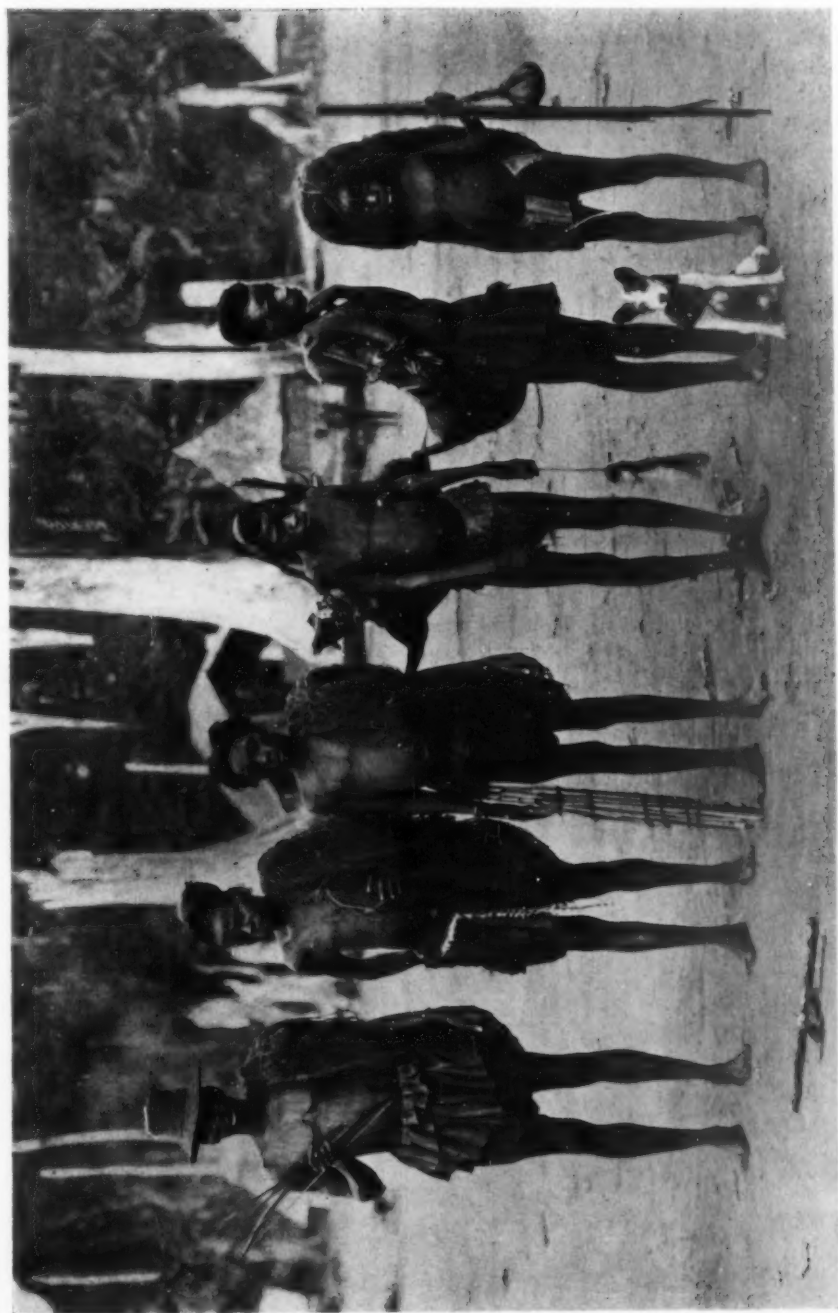
they are born and die in the densest superstition, but this latter is their religion, their code of morals, their own very rigid set of laws, which binds them together in spite of all savage feeling in true democratic spirit. The negroes we saw displayed a most admirable spirit of fellowship, cordially assisting one another in any difficulty. They might be hungry themselves but they unselfishly divided their food, and this so naturally that anyone could see that the contrary would have constituted a breach of the generally accepted standards. The greatest fallacy in judging natives is the common habit of travelers and many residents of basing their judgment about them upon information received from workmen, servants or



Makere women and children watching a dance. The children's heads are wrapped to lengthen the occipital region, this elongation being considered a mark of beauty. The dancing costume of the women consists of a green banana leaf slit into ribbons

speak even now about their "degraded condition," "shameless manners," and "behaviour like animals," perhaps because the warm climate allows them to walk about in just the state that seems, from all accounts, to have been the most satisfactory in Paradise.

half-civilized negroes. Even the most truthful individuals among these natives generally try to speak from the white man's point of view, displaying in this great shrewdness, so that any question asked is answered with the desire of pleasing the inquirer. This really ac-



MAKERE NATIVES, BACK FROM A HUNT

The nets they carry are fastened together and supported vertically by sticks so as just to touch the ground. The animal is tracked and driven toward the nets by the aid of the hunting dog with its wooden bell

counts for the many contradictory statements as to what would benefit these tribes most and what might be their greatest grievances.

The missionary societies in many cases receive special subsidies and are teaching mainly elementary classes in principal centers such as Boma and Stanleyville, some extending facilities for certain branches of industrial training. A really unified system of education can be introduced only when the facilities of communication lead to a greater centralization of the now widely scattered population.

It is probable that the present warfare in Central Africa, and especially in the Congo Basin, will prove relatively more disastrous to the black race of these regions than the European war to the different nations engaged therein; in spite of the fact that the belligerents on both sides have given out orders to the native soldiery to direct their principal aim to the destruction of the commanding white officers, so that it is not remarkable that only very few black men have been killed in the various engagements. Neither firearms nor explosives will play havoc among the

natives, but unfortunately the greater part of the territory in which this warfare is waged includes the districts most affected by the terrible sleeping-sickness, such as the Uganda, Tanganyika, Katanga and Sanga frontiers. Thousands of armed natives will certainly be infected before their dispersal at the conclusion of the war. They will carry this dread disease into nearly every region. Since the tsetse flies, the carriers of the sleeping-sickness germs, are widely distributed they will cause the rapid spread of this plague, for if they have an opportunity to suck the blood of only one infected person they may cause disaster by transmitting the disease to others living nearby. Once a region is thoroughly infected the natives are simply wiped out. This condition is the more hopeless since the usual prophylactic measures are considerably weakened as a result of the war and there is thus practically no hope of checking the scourge; for it needs the most exacting efforts of a well-equipped medical service, which entails an enormous expenditure. Most authorities believe that after the conclusion of peace there will be no large funds available for the benefit of African colonies.



Logo women dancing in thanksgiving for a good harvest

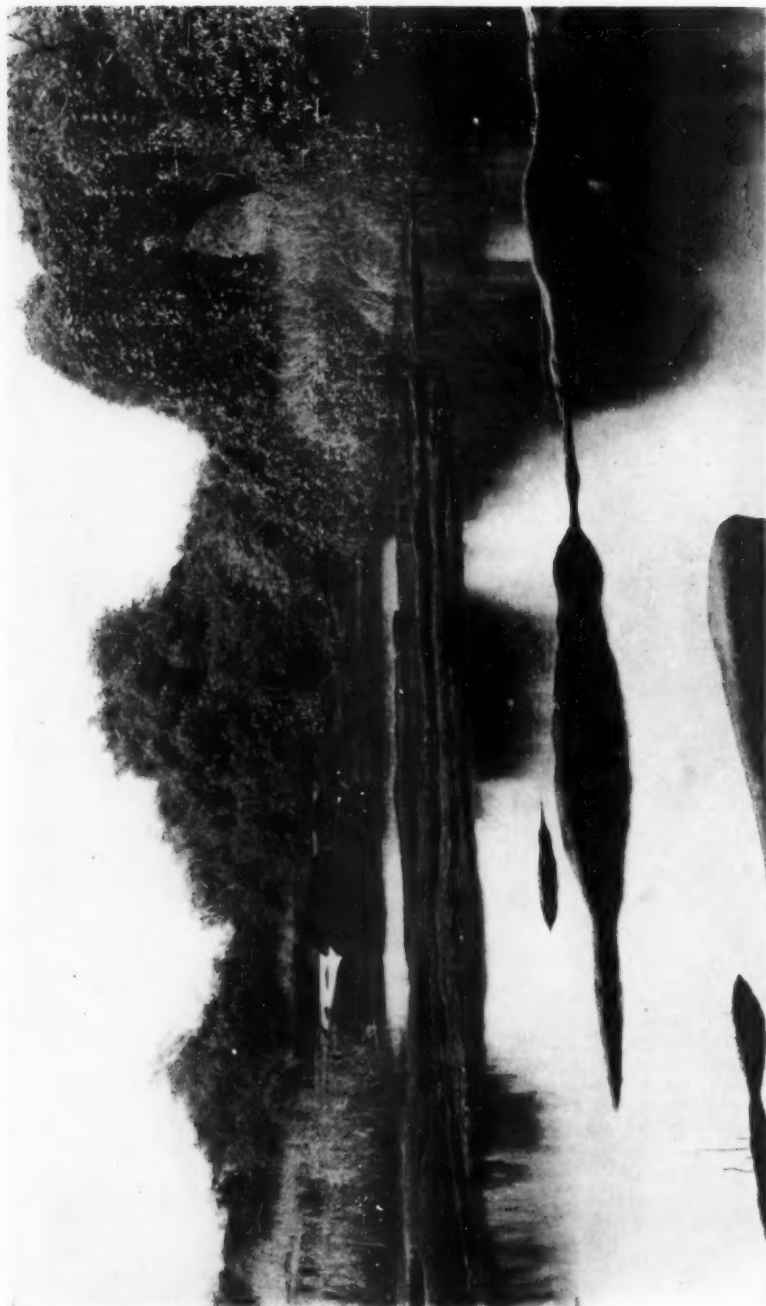
REPRODUCTIONS IN DUOTONE OF PHOTOGRAPHS GIVING GLIMPSES OF THE LIFE OF THE NATIVES IN THE CONGO

Photographed in Africa between 1909 and 1915 by Mr. Herbert Lang



LOGO HUNTERS OF FARADJE, UELE DISTRICT

They use these large bows and arrows for the bigger game, as antelopes and wild pigs. In war they pull the string with a twang which startles the foe, causing him to stop or turn, when a quickly fitted arrow brings him down. The small bells attached to the bow each indicate a particularly fine shot; during a hunt the bells are stopped with leaves but at a dance they jingle merrily. The man in front is a famous elephant hunter, the most famous in his tribe



THE RIVER ATUA, NEAR FARADJE, IN THE DRY SEASON

In May Mr. Lang's party crossed this stream on one of the long, damlike ridges of rock, but coming back in July was obliged to wade almost shoulder-deep at the same spot, balancing on the rock to avoid the water, sometimes fifteen feet deep, on either hand



AZANDE SPEARMEN "SHOWING OFF" IN MANZIGA'S VILLAGE, NEAR NIANGARA

The Azande, or "Niam-Niam," are famous as warriors, and during the latter half of the nineteenth century were continually making war on their neighbors to the southward, pushing their way from the Sudan down into the more fertile Bomokandi, where they are now firmly established, and where they have learned and adopted much in the way of material culture from their neighbors the Mangbetu, Makere and other tribes



MANZIGA. A CHIEF OF THE AZANDE

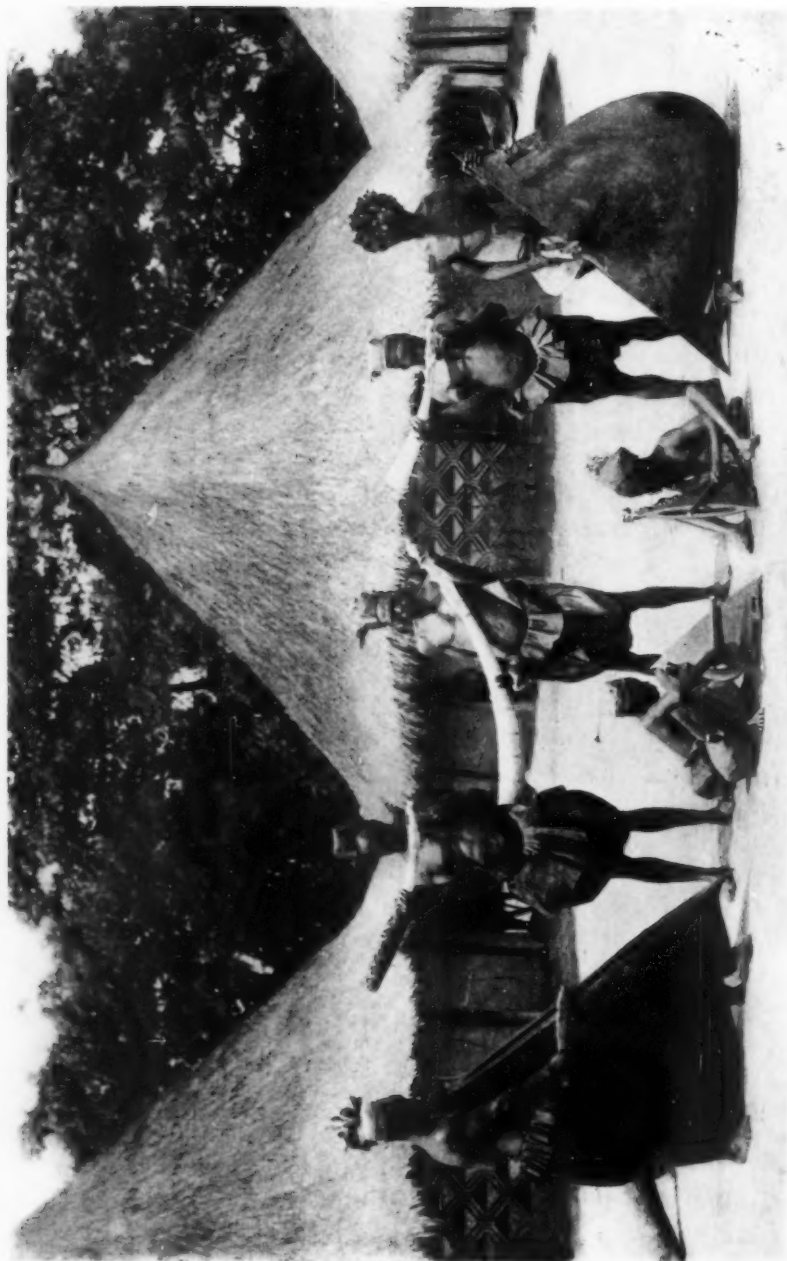
All important Azande chiefs in this region belong to the Avungura, the reigning clan. Most of the Azande believe that after death they will be reincarnated as animals, and the Avungura will then become lions. Manziga is one of the most important native chiefs around Niangara, ruling a large territory. He is unusually intelligent and exhibits much tact and diplomacy in dealings with the Belgian administration



**HEAD WIFE OF CHIEF ABIEMBALI: MAYOGO TRIBE,
ITURI DISTRICT**

Beneath the small, square-topped hat of woven vegetable fiber, she wears a sort of skull-cap adorned with hundreds of dogs' teeth, mostly canines. The crown of the hat is decorated with the red tail-feathers of the African gray parrot, which bird is often kept in captivity so that the much prized feathers can be pulled out as fast as they grow.

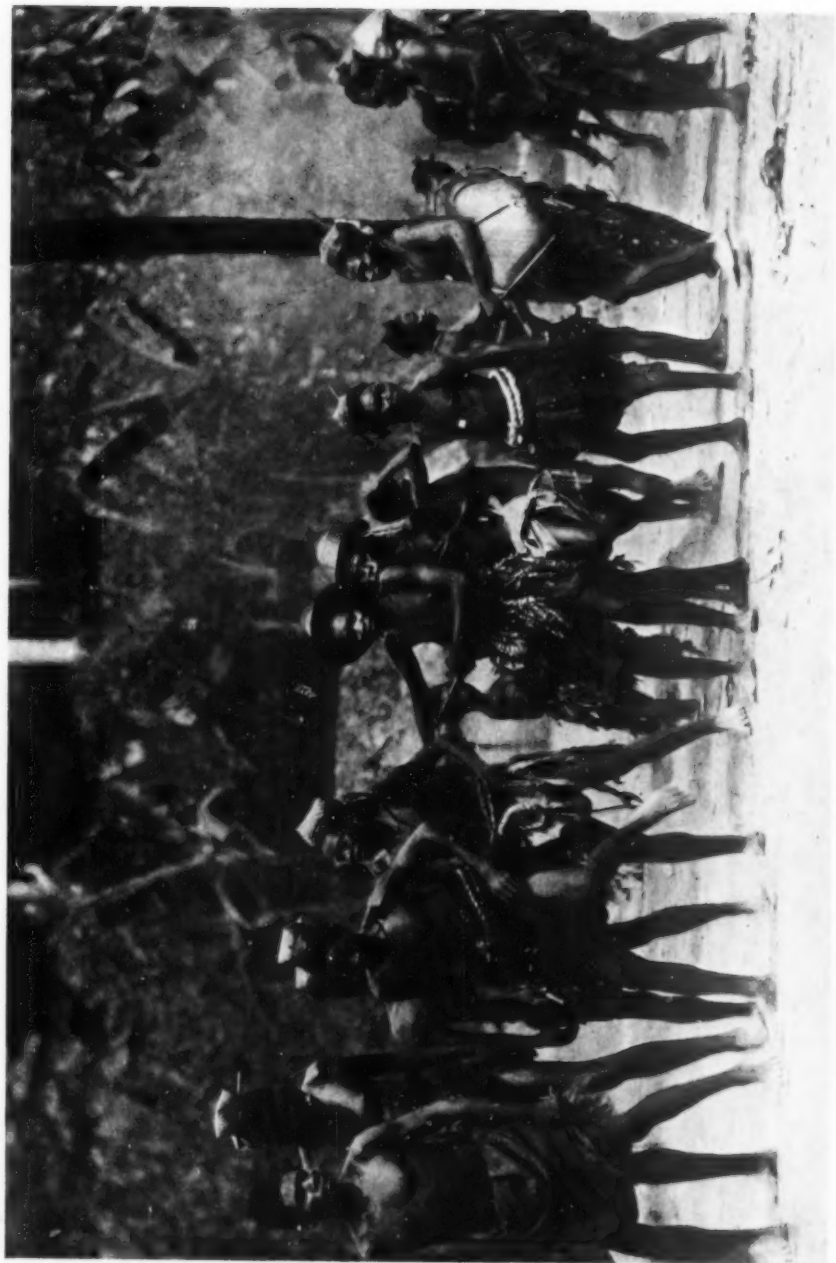
The larger hatpin is made entirely of ivory, while the smaller consists of a thin, pointed bone from the forearm of a monkey



IVORY HORNS AND WOODEN TOM-TOMS OF THE MANGBETU

These are carried after a chief to enliven a journey or used to beat time for dances in the village. Small boys make especially expert drummers and most of the noise is produced by the two small tom-toms in the center, a single beat from the larger ones being interposed only at intervals.

Note in background the regularity of the designs painted in red, black and white on the walls of the houses



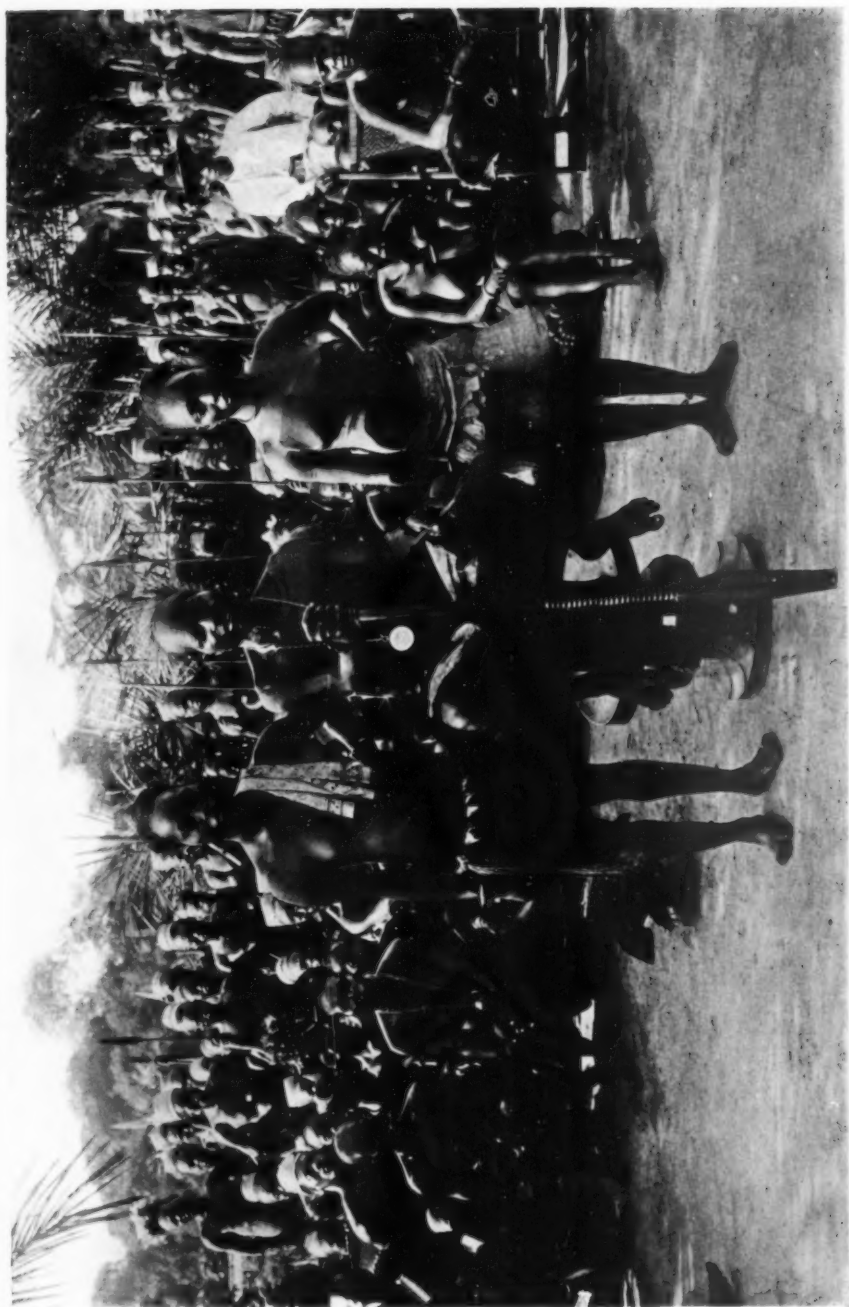
DANCE OF THE MAKERE. CELEBRATING A SUCCESSFUL HUNT

These are forest people and were formerly preyed upon by the Azande, but now are free from oppression and ruled by their own chiefs. The small aluminum medals, worn by two of the men, are government receipts for taxes



SCENE IN A MANGBETU VILLAGE NEAR RUNGU

The walls of the houses are covered with strips of bark, and the roofs made water-tight with broad, flat leaves attached by their stems to the rafters and bound with bark cords. In the foreground is a large signal gong, hewn from the trunk of a tree and shaped like an animal, the head and tail providing handles. It is used to signal from village to village or to summon for feast or dance.



DANGA, A PROMINENT MANGBETU CHIEF

Beside him stand two female body servants and behind are some of his people. The large medal hanging from his neck is the official sign of his rank as recognized by the Belgian administration. Of this he is very proud. His village is shown above



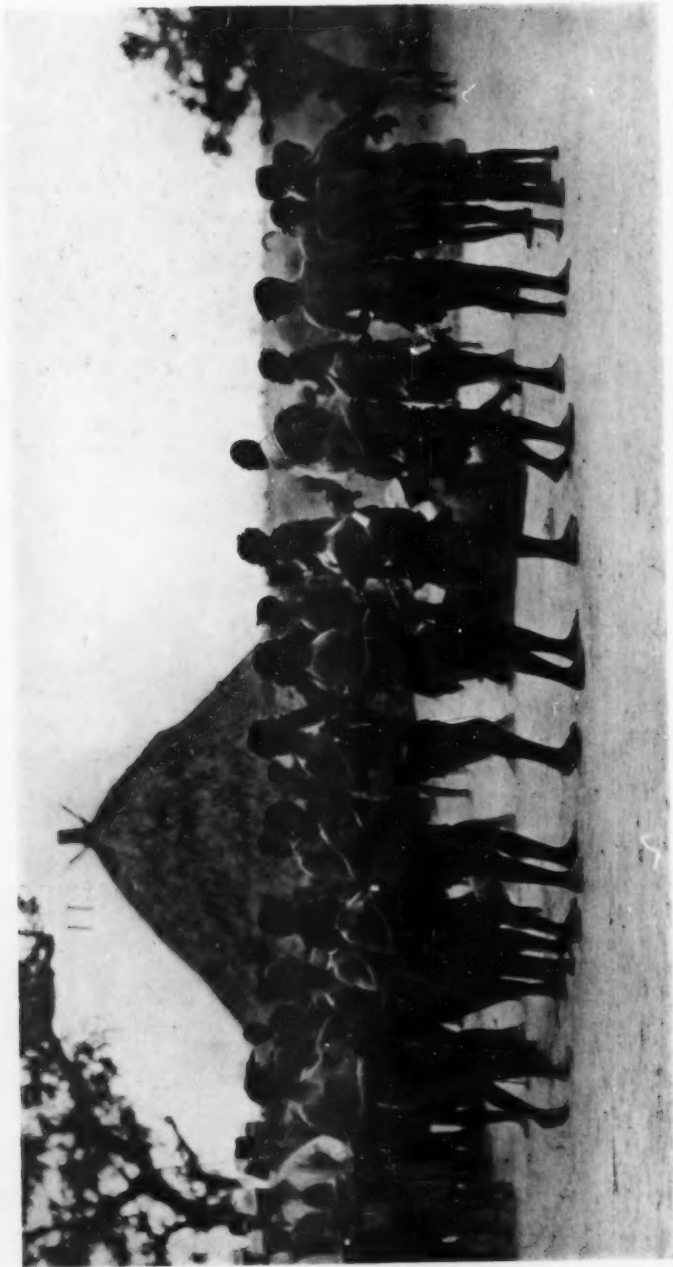
NATIVE BRIDGE ACROSS THE BIMA, NEAR NIAPU

It consists of many slender poles bound together by strong vines and capable of great resistance to the current when the stream is swollen by rains. The building of such bridges is encouraged now, together with the opening of roads through the forest, but before the advent of Europeans intertribal war prevented most native travel



MALELE CHILDREN AS THEY GATHER TO PLAY IN THE VILLAGES

There are no orphans in the Congo, in the sense of homeless children. Food is plentiful and bringing up children involves little labor or expense; thus an orphan child is always taken into another family. These children lead happy, carefree lives and, by helping in village and garden, learn without special training the domestic and other arts of their parents



DANCE OF AZANDE WOMEN, NEAR FARADJE

Though dances have often religious significance, they are also indulged in for pastime. Dances of this circular, slowly-rotating type, with drums beaten inside the circle and singing, are to be seen in widely separated districts, and are favorites with native workmen in government stations on Sunday afternoons



Mexican laborers at work clearing a part of the oldest eastern section of the ruin at San Pedro Viejo. The debris thrown out is a mixture of ashes and lumps of adobe from the fallen walls, in and under which are buried numerous human skeletons; also various implements, pottery, charred maize, and animal bones. View looking northwest

ANCIENT CITIES OF NEW MEXICO¹

By N. C. Nelson

LONG before Columbus and his Norse predecessors set foot on American soil there had arisen a peculiar type of town-building people in the southwestern part of the United States. This is a fact which at first strikes the observer as paradoxical. To the modern traveler who hastens across New Mexico and Arizona by train or auto, the country seems foreign, being apparently devoid of all the forms of life familiar to him in the East. He sees mostly bare, tawny-colored plains and rockbound mesas, interspersed with black lava-sheets and flying sand. The beds of nearly all of the tortuous streams winding through the landscape

are dry and lifeless and he consequently deems the whole region a desert waste incapable of supporting human existence.

This estimate is only partially correct however, for while the southwest is arid and desert-like it is nevertheless far from infertile. Natural oases exist in this, as in other deserts, and artificial oases can be and have been created and maintained, from early aboriginal days to the present. In this region the ruins indicative of former life number tens of thousands. Not only this but the particular environmental conditions obtaining here, and which appear so unfavorable, have produced, in a certain sense, the highest type of native American culture that we have within the limits of the United States. In speaking of the Southwest therefore, two outstanding factors, viz., aridity and fertility, must always be mentioned in conjunction. These two factors have wrought

¹ This article was written by Mr. Nelson on November 2, out-of-doors, as he sat on the ruin under process of excavation and watched the men work. It was despatched to New York the day following from Camp Pueblo Pasko, Santa Fé, the expedition's immediate base of operations in New Mexico. The illustrations in this article and the following are from photographs by Mr. Nelson.—THE EDITOR.



Excavated rooms in another of the oldest sections of the San Pedro Viejo ruins. Directly beyond the excavations is the ancient cornfield and farther on the Arroyo San Pedro. In the distance are the San Pedro Mountains. View looking east

themselves deeply into the life and character of the native people and have largely made them what they are.

Town-building in the Southwest had its beginning in the distant past and reached its climax before the arrival of the white man. The first native settlers (at least in the northeastern section of the pueblo area) who have left definite traces of themselves, appear to have lived in more or less thickly scattered small houses of one or two rooms. Just what relation these small-house dwellers bore to later village dwellers is not yet

clear, except in so far as their general mode of life appears to have been identical. The question as to what brought about town-building is not easily answered. One may be strongly inclined to say that the Indian village (of which there are several types) had its origin in bare economic necessity. This assertion cannot however entirely preclude social and defensive considerations, and so, if we are to be on safe ground, we must allow credit to all three factors — economic, defensive and social.

The particular type of pueblo studied

during the past three or four years by the Museum's expedition to the Rio Grande valley of New Mexico includes some of the largest ancient towns known in the Southwest. The ruins vary in size to be sure but several of them contain, or contained, from five hundred to three thousand five hundred rooms and more. The number of their inhabitants cannot be definitely estimated, but judging from the present-day Indian villages, some of which show a population ranging from one hundred to one thousand seven hundred, these ruins must in their day have sheltered even larger groups. These towns-people were not, as in our own modern cities, great masses of unorganized humanity, continually competing for a living at multifarious pursuits. They were rather closely organized coöperative societies, essentially communistic.

The Indian's needs were few but those few were imperative. In consequence of this his activities were limited and correspondingly intense. Agriculture was his mainstay and good crops generally depended on artificial watering. Under such circumstances, one man being unable single-handed to maintain an irri-



Excavated section across a communal building at Pueblo Tunque, showing the full width of six rooms. The walls are of adobe and in good condition, but the rooms do not ordinarily show such regularity in size and arrangement

gation system, the natural outcome was coöperation. Coöperation was similarly necessary for purposes of defense against the inroads of less provident neighbors; for as there is no reason for supposing these permanently settled agriculturists to have been aggressive warriors, we



IN THE SAN PEDRO VIEJO RUINS

Excavated series of rooms in one of the oldest sections. The space to the right and beyond is a mass of collapsed adobe buildings. View looking south



CAVE AT THE BASE OF POTRERO VIEJO, NEAR COCHITI

Artificially enlarged cave in the volcanic tufa. Hundreds of such caves exist in the locality and all were once inhabited by Indians. This one served also as camp for members of the Museum expedition while a ruin on the top of the towering mesa was being excavated

must think that their safety lay in well-organized defense. What more natural therefore, than that they should have coöperated in the planning and construction of large houses, capable of sheltering every family or household of the group and especially adapted for defense? Large communal houses are frequently found which must have been two to five or more stories high and which contained several hundred rooms. The majority of the ruined villages contain a series of these large houses, arranged on a quadrangular plan; this arrangement being also, clearly, an element of defense.

In other words the typical village finally evolved in the area under investigation by the Museum is suggestive

of our modern apartment-house cities but differed from them in this fundamental respect; that the Indian built his houses where our streets are and left intervening blocks open, not for the sake of light and air perhaps, but as places for industrial and social activities.

That type of village is now practically extinct. The Indian need no longer guard himself against marauding neighbors and the government stands ready to help him with his irrigation projects. Schooling has also had its effect on the younger generation. The compact communal settlements are breaking up and the Pueblo Indian is returning once more to the life in separate and scattered houses like his ancient forefathers.



Excavated room in the San Pedro Viejo ruin, showing two bins and one fireplace — the latter set into the floor; also some of the mealing stones and cooking slabs found in the debris



Excavated rooms at San Pedro Viejo, showing a human burial, also two pottery vessels set into the floor for storage purposes

EXPLORATIONS IN THE SOUTHWEST BY THE AMERICAN MUSEUM

By Clark Wissler

THE Museum began in 1909 a systematic investigation of the native inhabitants in the great romantic area known as the Southwest. Of all localities in the United States this is the richest in archaeological remains and the most conservative and aboriginal tribes are found within its borders. In the past, enough research had been carried on in the Southwest to make it clear that the magnitude and complexity of the problems to be solved were beyond the limits of the regular resources of the Museum, and that it would be unwise to take up work in that

part of the country until substantial outside support could be found. In 1909 Mr. Archer M. Huntington offered to give support to the undertaking. Accordingly, the curator of anthropology worked out a general plan, in conformity with which the work has proceeded until now.

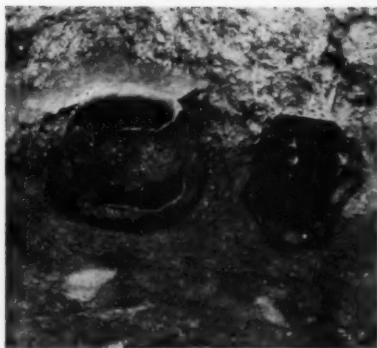
In the main this plan was to take up the historical problem in the Southwest to determine if possible the relations between the prehistoric and historic peoples. It was decided to concentrate the Museum's energies upon the Upper Rio Grande Valley, because that seemed



Excavated rooms in Pueblo Tunque, showing connecting doorways, also a corner bin and a human burial accompanied by two broken pottery vessels



Cross-section of an artificial dam at Pueblo San Cristobal. The Tano villages that were not by nature supplied with sufficient water, possessed large reservoirs constructed by throwing a dam across a shallow ravine in order to catch the rain and melting snow



Corrugated jar found in the corner of a room in the oldest section of the San Pedro Viejo ruin. Note the solid adobe floor on level with the top of the vessel but dug away except at the rear

most likely to have been the chief center of Pueblo culture as we now know it, and because there were to be found there numerous ruins which according to Bandelier, belonged to the immediate ancestors of the living people. The studies of the living races were to include not only the sedentary natives of the Rio Grande Valley, but also the less sedentary people of the same area, in particular the various groups of Apache and the Navajo. It was contemplated that when the historical problem in this particular area had been brought to a fair completion, the work would be extended westward into Arizona so as gradually to unravel the historical puzzle of the Southwest. While this was a very ambitious undertaking, the reports of our several field parties¹ show that

¹ Schedule of Field-Work, 1909-1915:

1909 — Dr. P. E. Goddard first began work among the Apache of Arizona and New Mexico and Dr. H. J. Spinden began his investigation of the Rio Grande Pueblo peoples. Dr. Clark Wissler spent a considerable part of this year and 1910 in a general survey of the field to the end that more systematic detailed plans might be developed.

1910 — Dr. Goddard continued work among the Apache tribes and the Navajo and Dr. Spinden continued the investigation of the Rio Grande pueblos. Miss M. L. Kissell made a special investigation of the textile arts among the Papago and Pima tribes.



Excavated room at Pueblo Tunique, showing a small enclosure framed with stone slabs and within which a metate is fixed in place for grinding maize

1911 — Dr. Goddard made a special investigation of the Kiowa-Apache; Dr. Spinden continued his work among the Rio Grande pueblos.

1912 — Dr. Wissler made a second general survey of the field especially in connection with the contemplated archaeological work by Mr. N. C. Nelson. Mr. Nelson made a general surface survey of the whole Rio Grande Valley from El Paso north, and later in the season began the systematic investigation of pueblos in the Galisteo Basin. This included the thorough excavation of Pueblo Kotyiti, a site whose history was fully known but which had been in ruins for more than two hundred years. Dr. Spinden continued his work among the Rio Grande pueblos.

1913 — Dr. Spinden completed his work among the Rio Grande pueblos. Mr. Nelson continued his archaeological work in the Galisteo Basin.

1914 — Dr. Goddard was again investigating the Apache and was accompanied by Mr. Howard McCormick to secure sketches and photographic material for exhibition purposes. Mr. Nelson continued excavations in the Galisteo Basin.

1915 — Professor A. L. Kroeber of the University of California volunteered to spend the summer at Zuni Pueblo where he secured a large collection for our exhibition halls and made a special study of Zuni social organization, and in addition gathered data on the ruins in the vicinity

very substantial progress has been made in the solution of the problem, and that in so far as the Rio Grande Basin is concerned, a definite conclusion has been attained.

As the work now stands the ethnological survey of the Rio Grande villages (by Dr. Herbert J. Spinden) has been nearly completed. In this work especial attention was given to material culture and art, since these are the two phases of culture that survive and leave their indices in archaeological collections. Investigation of the less sedentary peoples (by Dr. Pliny E. Goddard) has

progressed satisfactorily so that we now have fairly complete studies for several divisions of the Apache. It remains for the future to extend the work to the Navajo. The archaeological work (by Mr. N. C. Nelson) was begun in 1912 and as far as the northern part of the Rio Grande Valley is concerned is now nearly complete. The net result of this work has been to make clear the chronological relations of the various ruins in the vicinity, which in turn enables us to determine their historic relation to the living peoples.

It is planned that the work shall continue more intensively during the next few years than heretofore, since the way is now clear to a chronological classification of many groups of ruins. Thousands of dollars have been contributed to unearth the ancient civilizations of Egypt and the East, while here within our very borders are crumbling ruins of a past that has an intimate relation to our national history.

from which a chronological or historical classification of them can be made. Dr. Robert L. Lowie visited the Hopi pueblos to study their social organization and relationship systems. The specific problem here is to see whether any important Shoshonean traits of culture still survive among the Hopi, since they are a Shoshone-speaking people. Mr. Nelson again worked in the Galisteo Basin and made surface surveys southward to the vicinity of Zuni. In cooperation with the University of Colorado an expedition among the cliff ruins of Southern Colorado was carried on.

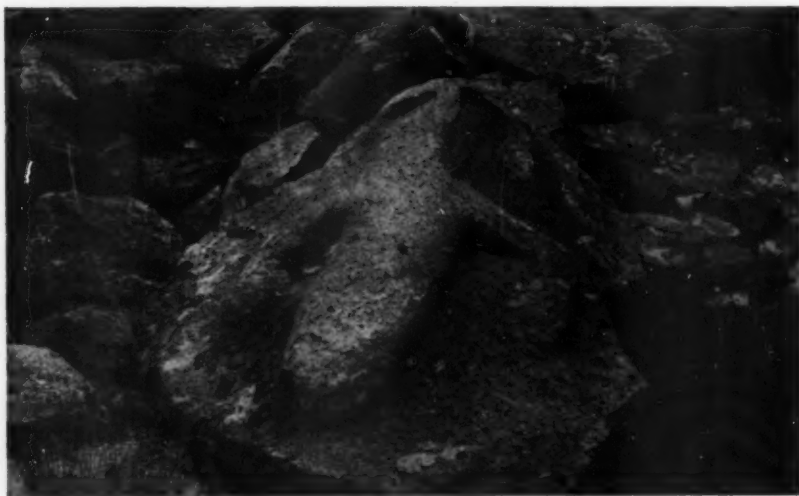


Image of a "panther," sculptured in volcanic tufa, found lying in the center of a ruined circular shrine on top of Potrero de los Idolos, a short distance west of the Rio Grande and the Tano habitat proper. The shrine is said to be still visited by the Indians of Pueblo Cochiti whose ancestors are supposed to have built the place

ANIMALS OF BLOWN GLASS

By Herman O. Mueller

THE technique of glass-blowing is many sided and allows construction of intricate and truthful models from life, of animals as well as of plants such as the famed Harvard glass flowers. The invention of the blowpipe at the early date of the first century before Christ, opened up an era for glass-modeling. In the process previous to that time molten glass or "glass paste" had been molded free-hand over a clay form, which could be easily removed after the glass cooled.

The blowpipe consists of an iron tube

about one and one-half inches long and one and one-fifth inches in diameter, with the aid of which the glass paste is blown to the desired shape. The mechanical tools which the glass-blower uses have always been very simple and relatively unimportant, but the natural instruments — the eye and the hand of the worker — are of the greatest significance.

The most important instrument in glass-blowing is the blast lamp. This is a very simple affair and consists of a brass tube about three-quarters of an inch in diameter and three to four inches long, into which a smaller tube is inserted. The larger tube supplies the gas and the smaller one the air. The relative quantity of gas and air is regulated by means of cocks attached to the tubes. A steady air pressure to increase the heat intensity of the flame is created by means of bellows, or still better by a compressed-air pump.

In early times an oil lamp was used in this apparatus, and the name "lampen arbeiter" was applied to the users to distinguish them from the workers in the glass factories. In some of the European glass-blowing districts the oil lamp is still used for glass-blowing. The gas lamp however is of course far superior. It naturally produces a considerably more powerful flame, and this makes possible the modeling of much larger objects. Other tools for glass-modeling are forceps of various shapes, scissors, carbon and iron pencils of different sizes and forms, and files. The forceps are used for handling the separate pieces of glass while being welded; the scissors are used for cutting away the superfluous glass; the carbon and iron



The blast lamp is an essential part of the equipment, but the trained eye and hand of the worker are his most important tools

pencils for widening the openings in glass tubes or finished parts, and the files for cutting glass tubes and rods. No iron molds of any kind are used for preparing glass models in the American Museum, but all parts are shaped free-hand from glass tubes and rods. Colored glass is frequently used for the colored parts, but if the desired tints and shades of glass are not available, plain crystal glass is molded into shape and the colors applied later with the brush or with an air-brush.

The process of using glass as a medium for representing animals will be realized

in some degree if we follow the construction of a glass model — for example, that of a colony of the protozoan *Gonium*. From a glass tube of about one-half inch diameter, a piece about two inches long is separated by means of the blast lamp, blown in the flame to a cuplike shape and opened out to its whole width at one end. The gas flame is brought into action on the opening and the force of the flame will by itself enlarge the opening; but if the carbon pencil is rotated inside the heated area at the top of the cup this will flange it out more quickly.

To imitate the coloring seen in the living *Gonium* individual, which seems to shade from a deep green below to a light, almost transparent tint above, hundreds of little green glass particles are welded to the inner surface of the glass cup before it is widened out, until the desired tints are secured. To do this a green-colored glass rod is broken up into small pieces and these are further ground in a mortar to the desired grain. A small quantity of these particles is strewn inside the cup which is then rotated in the gas flame until the green parts begin to fuse and adhere to the wall of the cup. This process is repeated until the desired intensity of the color is secured. When the green particles are applied thickly the color is more intense; when scattered, a lighter tint results.

After this the other parts of the animal such as nu-



Stages illustrating the modeling in glass of the microscopic animal *Gonium*.

These little, single-celled creatures live in colonies of sixteen together, and there may be very many such colonies in a drop of water

cleus, vacuoles and chromatophores, are fashioned separately from small tubes or solid rods of colored glass and fastened within the cup. The nucleus is blown from a small green glass tube into a hollow ball about one-quarter inch in diameter. One end is cut open for inserting the nucleolus which has been previously shaped from a green rod into a little solid bead. This is of a darker color than the tube used for the nucleus. To the solid bead, or the nucleolus, a short glass stem is attached by which it is to be supported within the hollow ball. When the nucleolus is inserted into the ball, a little spot of the shell of this ball is heated and the support of the nucleolus is fused to the wall of this shell. Then the opening of the shell is covered with enough hot glass to close it, and the nucleus is completed. The vacuoles are blown in the same manner as the nucleus, only they are of crystal glass and consist of only one shell. Nucleus and vacuoles have little stems attached to them by which they are fastened in the cup. The supports are placed where they will show least.

After all the parts are ready to be inserted in the cup, one after the other, they are held in place by the forceps, a small area of the outer wall of the cup is heated and the supports of the parts are fused to the inner cup wall. When this is done, the cup is closed by heating the glass around the rim opening and drawing it together until a rough closing is obtained. The superfluous glass which forms in this manipulation, is pulled



Early stage in the modeling of a simple radiolarian¹

¹ Radiolaria are tiny, one-celled animals which possess the faculty of extracting silica from sea water and forming with it skeletal structures to protect their soft, jelly-like body. They are found in both fresh and salt water, particularly the latter, and are usually microscopic, but giants among them may attain the size of a pin's head. There may be very many in a single drop of sea water, especially in the warmer seas, and they exhibit great variety of form

away little by little, and the resulting unevenness of the surface is smoothed out by reheating the closed portion and blowing several times through the hol-

low handle at the base of the cup. The air blown through the handle expands the heated glass and rounds off the cup. Then two short glass stumps (to which later flagellæ are to be attached) are fused to the top. Finally the point at the lower end where the cup was attached to the original tube, is melted off and a short glass stem to serve later for the concealed attachment is fastened in its place, but a little to one side of the axis. Following this a somewhat larger cup is made and the finished closed cup is inserted into it, the outer cup is in



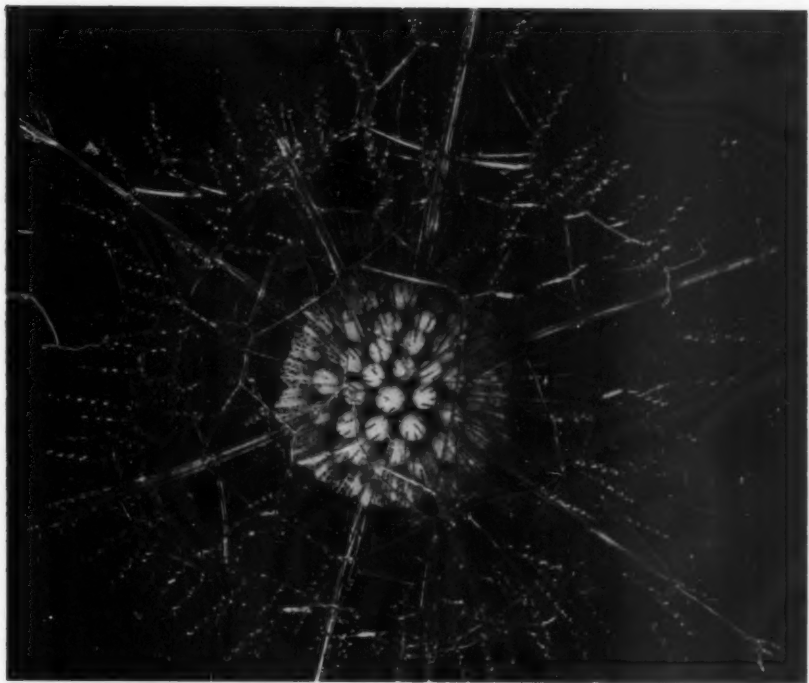
Model representing a highly magnified specimen of the hydrozoan ² *Tubularia harrimani*. Welding the fine, threadlike cilia involves great difficulty; a very little careless manipulation will cause the blast lamp to mow down whole areas of them

² Hydrozoa are stationary, jelly-like animals which attach themselves to fixed or floating ob-

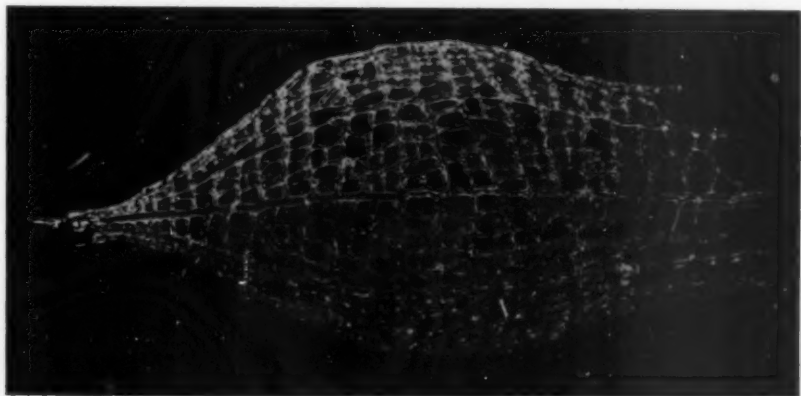
jects and feed on the marine organisms which come within reach of their waving tentacles. Many of these creatures are microscopic and many live attached to one another in colonies. Many of these latter may be seen in the wharf-pile group at the American Museum



Glass model of a jelly fish forming part of the wharf-pile group in the Darwin Hall of the American Museum. The two squids shown in the picture and the colonial hydrozoa attached to the wharf-pile are also fashioned in glass



Usually the glass models are made with constant reference to the actual animal under the microscope, but in the case of this rare specimen of radiolarian very carefully made drawings, plates and diagrams only were available. A complicated model sometimes takes two or three months to construct



Model of another radiolarian, highly magnified. When these minute organisms die their skeletons collect on the sea bottom forming a siliceous ooze. The island of Barbados, an elevation of the sea bottom, consists very largely of this radiolarian ooze and Barbados earth is used by jewellers for grinding and polishing

its turn closed and rounded off, and to this finally the two, whiplike flagellæ are attached. These are first drawn out from a glass rod into straight threads about the thickness of a fine needle, and then are curved by passing the glass threads through the flame several times in different directions. Now the glass stem retained at the lower end of the outside cup for a handle, is cut off short to serve as a concealed support for attachment to the final mount. Models for the other fifteen individuals composing the colony are now constructed in the same way and arranged on the mount in their proper places—and the model is complete.

The model of the radiolarian further illustrates methods of glass-modeling. From a solid glass rod one-quarter inch in diameter, nine smaller rods are fashioned each about one-eighth inch in diameter and about four inches long. These are somewhat bent and attached at equal distances to the rim of a perforated cup previously blown to represent the skeleton of the central capsule. In this way the principal framework of the skeleton is prepared. In order to give it greater stability during the work, slender glass supports are welded temporarily to the lower ends of the rods. Then beginning at the central capsule small glass rods are welded horizontally to connect the larger elements of the skeleton, until finally the whole network is completed as shown in the figure of the finished model.

Many protozoa are beset with countless hairs or cilia, and in representing these the welding of such closely set, fine structures on the models involves great difficulty. Even on models represent-

ing great magnification these cilia are often so fine that a little careless manipulation with the blast lamp will cause whole areas of the heated cilia to collapse, mowed down like grass before the mower's scythe.

Although molten glass may be brought into hundreds of different shapes, nevertheless the methods of blowing are always practically the same. It is the setting together of the separate parts however which requires great care and alertness, for when once the parts are wrongly joined they can be corrected only with difficulty or not at all, and it is usually necessary to reconstruct the entire piece from the beginning.

In many cases, where several parts are welded together, the finished structure must be thoroughly annealed. This is best done by greatly diminishing the air pressure in the blast lamp, when the glass parts are rotated steadily for some time in the smoke and flame of the weakened jet. This is necessary because in working the glass for a long time, alternately thinner and thicker places will occur. These produce an uneven tension and the glass will break if it is not carefully annealed.

As mentioned above the methods of glass blowing are very simple. Only skill in the worker is necessary to produce the most diverse shapes from the molten material. In order to attain this skill, years of training for hand and eye are necessary. The calling of the glass-blower so to speak is an inheritance from antiquity. The sons grow up to the father's trade and devote themselves from early youth to the acquisition of the all-important feeling and skill.



THE AMERICAN MUSEUM'S REPTILE GROUPS IN RELATION TO HIGH SCHOOL BIOLOGY

By George W. Hunter

Chief of Biology, DeWitt Clinton High School, New York City

THE concept of "adaptation to environment" is one of the most difficult to teach pupils of high school age, whereas it is one of the most valuable from the civic standpoint.¹ Particularly is this true of New

York City boys and girls, because of their lack of previous knowledge of the

to the artificial environment of the city, the relations of mutual give and take existing between plants and animals, are better shown by field and museum trips than in any other way."

.... "Many of us live in the city, where the crowded streets, the closely packed apartments and the city playgrounds form our environment. It is very artificial at best.... We must remember that in learning something of the natural environment of other living creatures we may better understand our own environment and our relation to it.".... "The physiological functions of plants and animals, the hygiene of the individual within the community, conservation and the betterment of existing plant and animal products, the big underlying biological concepts [such as adaptation] on which society is built, have all been used [in the book] to the end that the pupil will become a better, stronger and more unselfish citizen."—Editor.

¹The DeWitt Clinton High School of New York City has classes in biology each year containing between two and three thousand young men. The American Book Company has recently published a small volume by Mr. Hunter on civic biology for high schools, from which the following is quoted. The quotation gives a glimpse of the aim of the work: "Field [and Museum] trips, when properly organized and later used as a basis for discussion in the class room, make a firm foundation on which to build the superstructure of a course in biology. The normal environment, its relation

factors of the normal outdoor environment of plants and animals. This, it seems, is true to a degree of any city child, but it is especially noticeable in the children of the lower congested portions of our great city, with its complex artificial environment and its absolute lack of normal relations existing between plants and animals in nature.

To an increasing degree therefore, the American Museum has come to play an important part in filling in and rounding out certain biological concepts as taught in our secondary school courses in this city. Not only is the Museum fulfilling its "big brother" capacity through sending out its loan collections of hygiene charts, its bird and insect collections, but also within its walls it has several valuable collections and groups which are of very great direct service to those of us who are near enough to use them for laboratory exercises. The hygiene exhibit, with its striking moral of public and private sanitation and hygiene, applies directly and indeed constantly, in its many-sided relationship, to the biological problems as taught in a city high school. The Darwin hall, with its synoptic collections, enables the older pupils in advanced high school courses to obtain the meaning of evolutionary series, variation and the struggle for existence. The bird, reptile and amphibian groups are of especial value to the high school pupil and teacher because of the clear text illustrating adaptations.

All the readers of the JOURNAL are doubtless familiar with the habitat bird groups and the no less beautiful bullfrog group. But not all perhaps, are aware of the new toad group, which with its neighbors, the bullfrog, giant salamander and desert lizard groups, lies modestly hidden in the black recesses of the alcove on the second floor.

Those of us who know Miss Dickerson's *Frog Book* and its value, recognize at once the authoritative effectiveness of this series of groups.

The new toad group breathes the very atmosphere of spring, with its opening buds and apple blooms. A tiny pool, spring-fed, close to the broken-down stone wall, the tangle of shrubs, undergrowth and cat brier, the spring flowers—violets, adder's-tongue, cowslip—and the warblers perched on shrub and tree, mark the time of year. The chief value of the group, from the standpoint of the teacher of biology, lies in the amphibian life that it contains, and the usefulness of these types in demonstrating the idea of adaptation to environment.

In the right-hand corner of the group may be found numerous specimens of our common tree frog (*Hyla versicolor*). I say numerous with intention, because at each successive visit to this group I have found at least one more specimen, tucked away in some inconspicuous place and blending perfectly with its surroundings. What better material could we ask for the study of the adaptation illustrated by protective coloration? (And this in spite of the Neo-Darwinians!) Toward the back and at the left are found examples of Fowler's toad, one of our two common toads. Its life history is suggested in the egg strings, fresh laid at the first of May, and the adults, which we know in connection with gardens and dry land, also in the water. On the opposite side of the group is seen the larger and browner American toad and its tiny black tadpoles; for this toad lays its eggs about two weeks earlier than the Fowler's toad.

It is unnecessary to tell a teacher that in order to have a successful field or museum trip, he must first visit the locality, pick out the salient points of interest and work out a series of con-

nected questions. These questions must be so arranged that the groups of students taking the trip will be scattered with the focus of work at several centers. The reptile and frog alcove is quite an ideal place for a laboratory exercise because the children taken there may be scattered at work on the several groups and at the same time be near enough to come under the direct supervision of the teacher in charge. The outline which follows will serve to indicate the use that one teacher has made of this alcove and will also illustrate one of the several perhaps equally good methods of working out such a museum trip for the large classes found in the high schools of this city.

MUSEUM TRIP TO VISIT THE FROG AND TOAD GROUPS IN THE AMERICAN MUSEUM OF NATURAL HISTORY

Purpose of the trip — To study adaptations to environment.

Directions — Begin work at one of the two groups on which questions follow. Read the labels in front of each group and learn all you can about what the group contains before you begin to answer the questions. Then answer the following, making the answers tell a connected story for your notebook. Ask questions of your teacher only when you cannot find the answer yourself.

Questions for Study of the Toad Group

- 1 — What time of year does it seem to be? How do you know?
- 2 — What wild flowers are most abundant at this time in this locality?
- 3 — What animals are found living in the water? On the land or in the trees? Is any kind of animal living both on land and in the water? What are such animals called? (*Amphi* = both)
- 4 — Look for specimens of the tree frog (*Hyla versicolor*) at the right-hand side of the group. Describe three different phases of color in these frogs. How are changes of color in the nature of adaptations?
- 5 — Describe where and tell when toads lay their eggs. (Look in the right-center of the group.)

6 — Compare the egg masses of the toad with those of the frogs. (Note left center of the toad group for eggs of the green frog.) How are the eggs protected?

7 — Enumerate all the enemies of a toad seen in this group and tell how the toad is fitted (adapted) to escape from each of these enemies.

8 — Mention three structural adaptations found in a toad or frog which fit it for the life it leads. Explain exactly how each structure you have described is an adaptation.

Questions for Study of the Bullfrog Group

1 — Show three ways not mentioned in the last question in which the bullfrog is fitted or adapted to its environment.

2 — How do you account for the large size of the tadpoles in the frog group? How is this long life of the tadpole of interest to the man raising frogs for market?

3 — What are some of the enemies of the bullfrog? How might it escape from its enemies?

4 — Explain exactly how a frog catches an insect. (See left-hand side of group.)

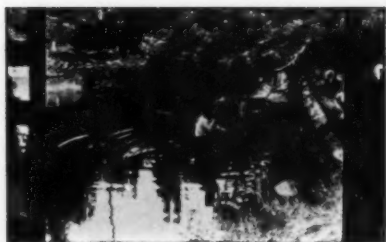
5 — Compare the habitat of the bullfrog with that of other amphibians found in the groups in this alcove. How is it fundamentally like the others and how does it differ?

Similar questions might be worked out for the lizard and salamander groups. Doubtless other teachers have worked out questions; a collection and compilation of such questions would be of value to those of us visiting the Museum frequently. All of us who now work in the Museum with our classes agree that the work we do there is yet in its very beginning. Its possibilities are almost limitless and with the splendid coöperation of the Museum authorities which we have had in the past, the future scope of Museum use by high school pupils and teachers will only be limited by the proximity of the Museum to the classroom or the willingness of the teacher to coöperate with the Museum authorities.



BACKGROUND STUDY FOR DEER GROUP

The painting, made by Mr. Courtenay Brandreth to form the background of the Museum's group, represents a spot on Shingle Shanty stream in the Adirondacks much frequented by the Virginia deer of that region, which like to wade in the stream and feed on the succulent lily pads and alder leaves



Leaving camp on the way to the salt-lick. [From motion-picture film]

HUNTING DEER IN THE ADIRONDACKS ¹

By Roy Chapman Andrews

FOR eight miles through the Brandreth Preserve in the Adirondacks, Shingle Shanty stream follows a winding, twisting course, at last losing itself in Lake Lila. Everywhere the stream is beautiful, its dark water, as a perfect mirror, reflecting the balsams, pines and feathery tamaracks of the virgin forest. Dark green alders form a thick curtain on either bank, sometimes giving place to small, grassy meadows but closing in again as the stream narrows, to lock hands across the water.

During midsummer when the blazing sun has dried the woods and the air is fragrant with the scent of balsam, deer wade into the stream to feed upon the succulent lily pads and grass which choke its course.



The "blind" at the salt-lick. A huge, green bag, kept open by a spread umbrella supported in the ground. This is where Mr. Andrews lay in wait with the camera. [From motion-picture film]

Our tents were pitched on a curve of the stream in a grove of spruce and balsams, where we had a clear view for two hundred yards up the broad path of water to a ragged sky line cut by the pointed summits of pines and tamaracks. I shall never forget the first night in camp at the close of a perfect day. When the yellow rays of the lowering

sun shot deeply into the forest the hermit thrushes began their evening song, every liquid, flutelike note clear-cut and wonderfully musical against the background of perfect stillness. As the light dimmed, one by one the thrushes ceased, leaving only

the voices of a few "whitethroats" sleepily calling to one another from the alders across the stream. Then the stars came out, low and brilliant in the clear air, and in the night our tent glowed from the light within like a great golden pumpkin in the forest.

The next morning work began. At daylight we were in the canoe, stealing

¹ Through the courtesy of Colonel Franklin Brandreth and Mr. Frederick Potter, the Museum was granted the privilege of securing on their preserve at Brandreth Lake the specimens and accessories for a group of Virginia Deer. The Museum is also indebted to Mr. Courtenay Brandreth for the background study, a photograph of which is here reproduced.



Flashlight picture of two does at the salt-lick in the forest. The salt was placed in an old tree trunk a month before the advent of the hunters, so that the deer had become accustomed to going there



Our camp on Shingle Shanty stream in the Adirondacks

noiselessly down the stream, hugging the bank on the open stretches and shooting swiftly around the narrow curves, hoping to catch a deer in the water feeding on the lily pads. I sat in front with the motion-picture camera on the very bow and a rifle by my side, but the work was not very evenly divided

for my wife in the stern was responsible for all the paddling.

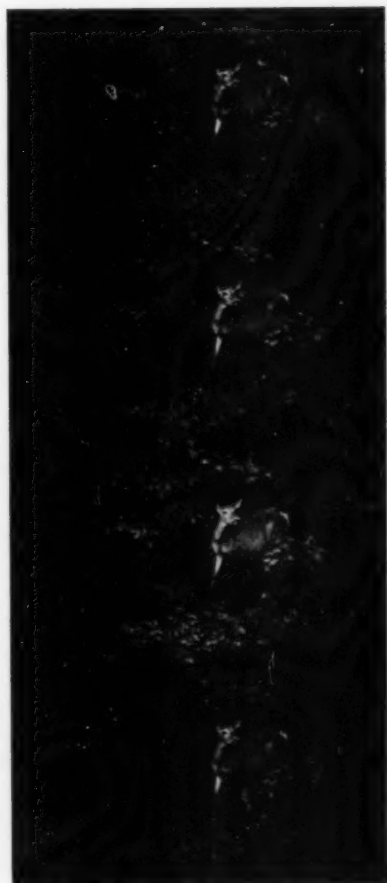
We were out seven hours but it was a morning of disappointments for, from a heavy rain two days before, the water everywhere covered the grass and other vegetation growing in the stream. Several times deer crashed in the bushes

beside us but we could not see through the leafy wall of alders. It was evident that, until the water lowered, work on the stream was useless, so we next tried a "salt lick" above camp. A month before we came, Courtenay Brandreth had filled an old log half full of salt and it was now so torn and pawed that the story was there for all to read.

The lick lay in a lovely spot beside the water under two splendid pine trees,

veritable castles in the air. In the bushes across the stream we concealed one of Dr. Chapman's bird blinds, which consists of a huge green bag kept open by a spread umbrella supported in the ground. Inside we placed the motion-picture camera and settled ourselves on two camp stools with books and a rifle.

All the afternoon we waited, kept in a fever of excitement by a deer which snorted and stamped in the forest behind



This little doe returned again and again, insatiably curious to solve the mystery of the camera. She was always easily frightened however, and it took ten hours of crouching in the blind to obtain the film



Young doe feeding among the alders. Startled by the whirl of the hidden motion-picture camera, she stood for only a few seconds. [From motion-picture film]



Off to cover. This series of five photographs from the motion-picture film represents only one-sixth of a second in action

the lick but was too suspicious to come to the water. The next day there was better luck and for ten hot, breathless hours we sat in the bushes, fighting mosquitoes and "punkies" but thrilled by the picture before us.

We had reached the "blind" at six o'clock in the morning and it was eight before anything happened; then suddenly there came a soft swashing in the water below. A deer was wading slowly up the stream and as its head appeared around a clump of alders, not ten feet away, I started the camera. With a snort of surprise the animal dashed up the bank into the woods. It was a two year old doe out on an early morning ramble, and I was sure she had been so badly frightened that we would not see her again that day. Her curiosity, however, counterbalanced her fear and half an hour later, with a few nervous snorts and much stamping of her pretty feet, she ventured down the hill toward the old log. When the whir of the camera sounded like an angry rattlesnake from the bushes she stood for a few seconds, but suddenly lost heart and whirled away into the forest, her white tail frantically waving in the air.

Again and again she returned, drawn by insatiable curiosity, but never to stand longer than twenty or thirty seconds. We sat in the blind for ten hours, cramped and hot and fly-bitten, and at the end had not more than sixty feet of film, but the excitement of the day had been immeasurable; I learned too that it would be pretty hard to kill a deer, for watching the little doe had suddenly made it sickening to think of snuffing out its life with a bullet.

Several more days were spent at the blind with success only from the picture standpoint, but every day the stream was becoming more nearly normal and we hoped for results within a week. Then on the night of July 20 the heavens opened and for three hours the rain fell

in torrents. The sheer weight of pounding water threatened to tear our tent in shreds, but the silk had withstood tropical storms of equal violence and we spent a comfortable night when the roar outside had ceased. The next morning the stream was almost in our camp, which the guides had said was well beyond the reach of summer freshets. All day the water rose, but we had carried our food and blankets to higher ground and for a week remained in an open camp a few hundred yards away.

It was useless to think of work upon the streams or ponds for at least a fortnight, because the woods were so soaked with water that the deer had moved to higher ground. We hunted diligently but the never-ceasing rain was a serious handicap and not until mid-August did I shoot a buck suitable for the group; a doe and fawn were secured a week later.

It was a labor of love to select a spot for the background of the group, for almost any curve of the stream was a picture in itself. With Mr. Courtenay Brandreth who had volunteered to make the field painting, we paddled up and down discussing the possibilities of every portion and, as the artist, he finally selected an open stretch, where on one side the alders gave place to a grassy meadow with the blue summit of Albany mountain far in the distance. At this very spot a few days later as the canoe slipped around the curve, we surprised three does feeding in the stream and a fourth upon the bank. For a moment they stared at us but, as the camera began to whirl, in great leaps they dashed for the friendly cover of the alders only to stop a few yards within the forest to blow and stamp in protest at the interruption of their breakfast.

September was ushered in by the dry, hot weather we had hoped for all summer — just when our work had been completed and it was time to start for home.



Doe, startled by the sound of the camera, plunging frantically into the forest. [From motion-picture film]

But the last few days were full of feverish excitement, for the stream swarmed with deer driven to the water by the heat and the flies.

One morning we "jumped" five does in almost as many minutes. The first was at the end of a long lane of water, all but her head submerged, feeding on the tender alder leaves which dipped low toward the surface. We were in full view before it was possible to swing in toward the shore, but my wife sent the canoe forward so noiselessly that the deer continued to feed undisturbed. Suddenly she saw us and dashed in great leaps down the stream and around the bend.

A few hundred yards farther on there was a deep pool enclosed by alders, but edged with succulent grass. As we neared the spot, I saw a circle of ripples spreading out beneath the bushes and knew that a deer must be on the other side. At a signal my wife dug her

paddle into the mud sending us spinning around the curve. There was the deer sure enough, a big doe with her mouth full of lilies. I started the camera just as she snorted and plunged forward into the pool. In a second she was beyond her depth and swimming frantically, her big ears waving back and forth and a long streamer of grass from her mouth trailing astern. It was only a moment before she struck the soft bank on the other side and with two or three mad plunges threw her dripping body into the alders.

The week was full of incidents such as these, and it was with a good deal of regret that we broke camp on a hot Thursday to spend our last three days at the Lake with Colonel Brandreth. We had been there many times during the summer, often wet and tired and discouraged, but always to find a warm welcome from every inmate of "Camp Good-Enough."



NEWS FROM THE CROCKER LAND EXPEDITION

THE EXPEDITION AT ETAH AND THE "CLUETT" AT NORTH STAR BAY BOTH TO WINTER IN THE ARCTIC

[With quotations from letters from the Arctic]

AS announced at the time in the New York City papers a cablegram was received at the Museum on November 10, from Mr. Knud Rasmussen, Copenhagen, regarding the Crocker Land expedition. This gave the news of the failure of the "Cluett" to reach Etah where she was to have taken on the members of the expedition for return to civilization. The Museum did not give up hope of the return of the "Cluett" and the expedition to New York this fall until the very end of November. It is now believed however that both the original expedition under Mr. Donald B. MacMillan and the ship with Dr. E. O. Hovey and Captain George Comer sent to bring this expedition home, have been forced to winter in the Arctic, the expedition staff at Etah, the "Cluett" in North Star Bay. Both parties are well equipped with supplies and with every convenience for scientific work, so there can be no fear as to the safety of the parties, their comparative comfort and profitable scientific results from the enforced stay. The cablegram is given below:

Mail from Crocker Land expedition arrived and delivered your [American] Embassy. "Cluett" arrived North Star Bay twelfth September after thirty-five days ice hindrances and motor damage Melville Bay. Dared not go to Etah account autumn ice but kept near our station, while our missionary motor boat left for Etah to fetch expedition members to "Cluett." All well.

[Signed] KNUD RASMUSSEN.

A letter supplementing this cable arrived later from Mr. Rasmussen in which he says:

Our own ship "Kap-York" has not yet arrived [at Copenhagen]. When it arrives, probably early in December, I expect to be able to supplement this letter with details obtained from my captain. The "Kap-York" being obliged to proceed southward [from North Star Bay] under sail only, had to be tugged out of the harbor before our motor boat could be sent northward, and so we have no recent news of your expedition.

The following is a quotation from a letter written by Mr. Donald B. MacMillan at Etah, North Greenland, on April 6, 1915, and received in New York on December 3, forwarded from Copenhagen by the American Embassy:

Mail received a few days ago tells of the European war and the terrible loss of life. It is said communication with Denmark is uncertain so you may not receive this letter for some time. We realize that affairs at home must be very unsettled making it doubly hard to secure a suitable ship at a reasonable price to transport the expedition to America. Naturally the boys are very anxious to get home and would be disappointed if a ship failed to arrive, but if such should happen, do not be a bit alarmed over our safety; we can pull through all right.

The season is a very hard one here for the Eskimo. Within the memory of the oldest there has never been such a year. They have eaten their dogs as the only food available and burned their sledges for fuel. It is possible to sledge even to the Cary Islands, something which has never been done before.

The expedition will put in caches at six different points on the Greenland coast for the return of Ekblaw¹ from his trip of the next two months. The last cache will be at Cape Constitution, two hundred and twenty-five miles north of Etah. This work will lead us over Dr. Kane's whole trail and will yield some unusually interesting photo-

¹ Mr. W. Elmer Ekblaw, geologist and botanist.

graphs such as of Humboldt Glacier. I am confident that there are many records at Kane's winter quarters at Rensselaer Harbor. We shall also do bird work one hundred and thirty miles south of Etah on Saunders Island, one of the most interesting spots of the world to the ornithologist.

We are mainly O. K. in health. Green and Allen¹ built a little shack last fall for wireless at one of the islands in the outer harbor. Conditions out there were so favorable for reading and study that they preferred to remain through the winter, both claiming they had lots of work to do and that was the place to do it. When they came into the house however the first of February, both were in poor health. Later Green started out to cross the channel to go to our big cache in Hayes Sound and broke down completely. He returned, went to bed and was put on a diet under doctor's orders. He is apparently all right now but not yet fit for a long trip. Allen is wholly recovered. Tanquary² had the misfortune to freeze both big toes on his Melville Bay trip during the winter. The doctor hopes that an operation will not be necessary. If a ship reaches us and Ekblaw does not stay with me, I may be landed over in Jones Sound with one Eskimo. Here I shall remain one year for ethnological work, and sledge from here to the northern coast of America.

Mr. W. Elmer Ekblaw writes on March 20, 1915, also from Etah, as follows:

On the eve of my departure on a trip across Ellesmere Land and back across Grant and Grinnell lands by way of Greely Fjord and Lake Hazen, I am writing you briefly of my hopes and plans. Since last winter I have been arranging to take this trip this spring. I shall leave to-morrow fully and splendidly equipped, not able to think of a single additional article or preparation which would further insure my safety and success. I have the best sledge we have yet made; I have a fine team of dogs; my clothes are all first-class; I have all the food and fuel I can

carry; I am in the best of health and best condition for Arctic work; I have two of the best men in the tribe, Esayoo and Etukashoo, to accompany me. I can conceive of nothing except a most untoward accident that could prevent the successful execution of my plans and my safe return.

I shall proceed leisurely enough to take advantage of every likelihood of scientific investigation; to hunt food for dogs and ourselves in every favorable locality; to explore the unknown reaches of Greely Fjord. I am depending so largely upon the game of the country over which we travel for the chief food supply, that I am taking across the Ellesmere Land glacier but twelve days' pemmican. I feel that I am quite justified in doing so, for on a 1100-mile circuitous route, it is impossible to carry food for the entire way.

I expect to study the geology of Bay Fjord very carefully. The Eskimo tell me of numerous coal seams of great thickness and rocks rich in fossils. Green saw a coal seam eighteen feet thick on his trip of last year, and from the point from which I was forced to return I saw great ledges and cliffs of limestones, shales and sandstones. The physiography, structural geology, and I hope paleontological and stratigraphical geology will merit all the attention I can give them. The early part of my trip will of necessity be confined largely to geology, for the snow covers the vegetation and no birds have yet arrived. From the first of May onward, I expect to get some work in botany and ornithology. I find that I have more than one hundred and ten different species of plants in the collections I made last year.

I wish to say of Tanquary, who had an unfortunate trip on Melville Bay, that he is made of the stuff heroes grow from, and that for sheer grit, unflinching good nature, and cheerfulness in pain, he measures up to the highest. The Universities of Illinois and Harvard may well be proud of him.

It is possible that I may remain in the North another year after this season, if it seems that the results which I can reasonably expect to achieve would justify my doing so. Two good fields of work in botany tempt me—that about the valley of the Mary Minturn River, and the other at Kaugerdluquah, at the head of Inglefield Gulf.

¹ Ensign Fitzhugh Green, engineer and physicist; Mr. Jerome Lee Allen, electrician and wireless operator.

² Mr. Maurice C. Tanquary, zoölogist.



BEGINNINGS OF AMERICAN NATURAL HISTORY¹

By Charles R. Eastman



UNDER the native appellation of Tlacaxolotl, Hernandez gives an account of the tapir, its characters being fused, however, with those of another mammalian species. Jonston, in his *Natural History of the Fourfooted Beasts* (1678) has a chapter on "Certaine Outlandish Creatures of a doubtfull kind," wherein are included an English rendering of Hernandez on the tapir, and also one taken from Nieremberg and Lery, under the caption of the "Danta", or "Cappa." The former version reads in part as follows:

"Of the Tlacaxolotl"

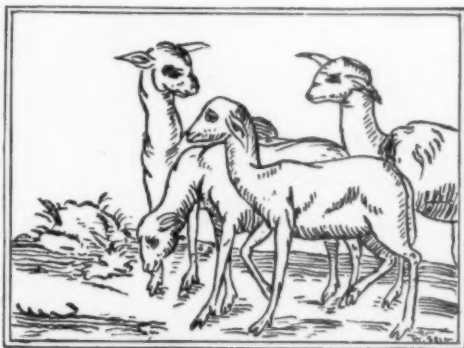
"Having through Gods grace finished the History of the Fourfooted Beasts, as many sorts as are, as yet knowen, I thought good to adde this appendix about forreigne doubtfull Creatures, which I am yet thinking to what head, or kind to referre. As first: The *Tlacaxolotl*, it is roundish-faced, bigger then a Bull, great-headed, long muzzle, broad eares, cruell teeth, faced almost like a man, whence it hath the name: the neck thick, the nails like the Bulls, but larger: the buttocks great, and broad, tayl thick and long; skin thick, hair yellowish, and bristly. It is seldome found, living among stones, and in desolate places. . . . The flesh is eatable. It fears not the face of man; Arrows cannot pearce the hide; therefore they catch them in pit-falls, and holes covered with leaves, as the Indians doe Elephants."

"Of the Danta, or Cappa"

The Danta, or Capa, or Tapiroussu, or Doueanar, resembles the Mule, having such eares, a Calves lips; the upper-lips hangs a hand-

full over the lower, which he lifts up, when angred, in the rest like other beast, but a Calf most; he hath no harme. . . . He is reddish-haired, and that hanging down, and resembles a Cow in bulk, and shape. But that he is not horned, and hath a short neck, and long dangling eares; by his dry, and slender legs, whole hoof, a man may take him to be of the breed of the Cow, or Asse, yet differs much from both, having a very short tail, (though in America many beasts are bred, without tails) and hath much keener teeth, yet none need feare him, he trusting more in flight, then fight. The wilds shoot them, or catch them in pits, or grins, and have handsome devices to hunt them. They value him highly for his skin, which they cut round, and lay a sunning to make targets as big as a reasonable tun, which they use in warre, as being hardly to be pearced.

For his descriptions of the opossum the compiler whom we have just quoted draws upon Maregrav (1648), and this author figures and describes two species. The same animal is also shown, together with the peccary, agouti and rare three-banded armadillo in César de Rochefort's work (1658) on the natural history



Peruvian llamas. One of the earliest figures of the American camel found in printed books, although there are much older designs of the animal in maps and native works of art. [From the Antwerp edition of *César de León*, 1558].

¹ Concluded from the last issue of the JOURNAL.

of the Antilles.¹ An animal thought by Eduard Seler² to be the opossum, by

¹ It is charged by J. B. Dutertre that the bulk of this work was taken, errors included, from his own book on the Antilles, which appeared in 1654. Le Père Labat (*Voyage*, 1722) also refers to the Sieur de Rochefort as a plagiarist from Dutertre. One of the rare edentates (*Dasy-pus novemcinctus* *hoplites*, G. M. Allen) figured

by these writers has been rediscovered, in the island of Grenada within the last few years by Glover M. Allen. See *Bull. Mus. Comp. Zool.* vol. liv, no. 6, 1911.

² Die Tierbilder der mexicanischen und der Maya-Handschriften. *Zeitschr. für Ethnologie*, Jahrg. xli, 1909.



Big game and other animal likenesses from the first encyclopedia printed in our tongue, that of Bartholomew Anglicus, 1494. Some of the same animals are much better drawn in the Album of Villard de Honnecourt, a thirteenth century artist and architect

Allen and Tozzer,¹ however, interpreted as a spotted dog, is depicted in several of the Maya codices that have come down to us from pre-conquistatorial times.

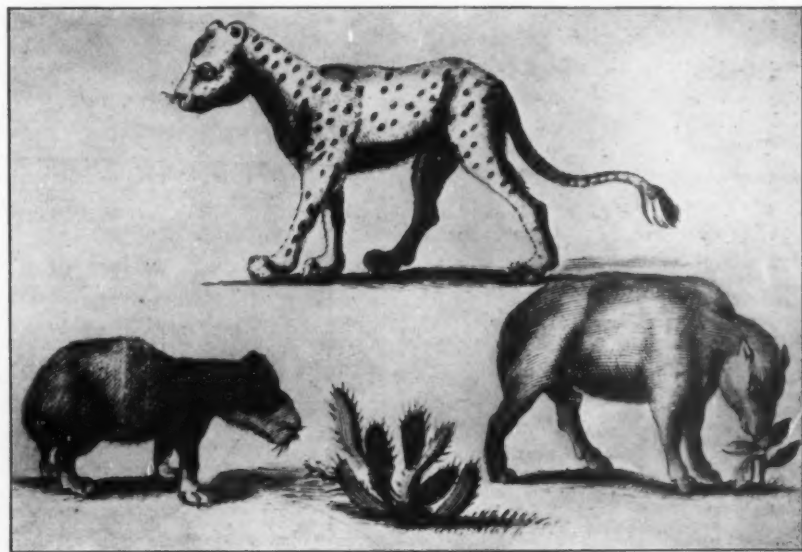
Interesting in connection with the aboriginal spotted dog of Mexico, and the *perro mudo*² of the West Indies (first observed by Columbus in Cuba and Jamaica) is the race of hunting dog which we find depicted in the minor arts of pre-Homeric civilization bordering the Aegean, and continuing until historic times. One of the earliest naturalistic paintings of a spotted dog, dating from at least the thirteenth century B. C., is found in a colored frieze from the palace of Tiryns, discovered in 1911. The subject is a boar hunt, and the boar

is shown driven by dogs on to the spears of the hunters. In the background is a marsh with weeds. The original of this painting is preserved in the Museum at Athens, and copies exist in the British and various American Museums.

The *Letters* of Hernando Cortes to the Emperor Charles V. are recognized as "an historical monument of the greatest authenticity and value," forming, with the *True Relation* of Bernal Diaz, the original source of our information regard-



Egyptian hunting-dog, from an early dynastic (5000 ? B. C.). Stone palette found by Quibell at Hierakonpolis



Brazilian quadrupeds, the jaguar, capybara and tapir, after colored drawings introduced in Blaeuw's map of Brazil, 1605

¹ Animal Figures of the Maya Codices. *Papers of Peabody Museum, Amer. Arch.*, vol. iv, 1910.

² A particular description of the native West Indian dumb dog is given by Oviedo (1535), who is also the earliest to describe in detail the hutia (*Capromys founieri* Desm.). See W. S. MacLeay's "Notes on Capromys," in *Zool. Journ.* vol. iv, 1829.

ing Mexico. The five *Letters* have recently been published by F. A. MacNutt (1908) in English translation, and are not without interest from a purely natural history standpoint. Very valuable for the student are the bibliographical notes contained in this latest edition of the *Letters*, and also those given by the same translator in his new (1912) version of *The Eight Decades of Peter Martyr D'Anghera*. Critical notes on the chief Spanish sources for Central and South American archaeology on natural history are interspersed throughout A. F. Bandelier's work on *The Islands of Titicaca and Koati* (1910).

English translations exist also of the narratives of two early expeditions across the southern part of the North American continent, those led by Panfilo Narvaez and Hernando de Soto. In the relation of the former of these expeditions, by Cabeza de Vaca, is found the earliest account (1537) of the American bison. A few years later, in 1540, herds were next seen by white men accompanying the Coronado expedition.¹ Probably the earliest picture of the animal in question is one given in the *Idrography* of Rotz (1542), and this was copied in the maps of Hondius, (1630 edition of *Mercator*) Blaeu (*World Atlas*, 1664-65) and other geographers. It may be remarked in passing that one of Blaeu's maps of Brazil (vol. viii) is ornamented by col-

ored figures of the tapir, jaguar and capybara, and early American cartography in general abounds in interesting portrayals of physical, animal and vegetal features of the New World.

Among North American fur-bearing animals the beaver holds first place in historical importance, and has given rise to voluminous literature. The first public seal of the province of New Netherlands, in use from 1623 to 1664, carries the beaver as an armorial device. It is represented also in Vischer's "Map of



The Old World beaver (*Castor fiber*) engaged in felling a tree, as shown in one of the earliest printed works on natural history, the 15th century *Ortus Sanitatis* of J. von Cuba

Novi Belgii" (1656), together with the fox, marten, bear, deer, wild turkey, heron, etc. Probably the earliest printed illustration is one occurring in a plate given by Arnold Montanus (1671), in his work already mentioned.

A much better figure of the beaver, together with hunting scenes of the bison and other animals, is to be found in Baron La Hontan's *Nouveaux Voyages* (1715). Horace T. Martin, in his work on the Canadian Beaver (1892), and also Dr. F. A. Lucas in his interesting recent

¹ Annotated translations of the narrative of the Hernando de Soto expedition, and of the Relation of Alvar Nuñez Cabeza de Vaca, were published by Buckingham Smith in 1866 and 1871. A new translation of the journey of Cabeza de Vaca, by F. Bandelier is included in the Trail Makers Series (1905).

There are several English versions of the narrative of the Coronado expedition; one edited by G. P. Winship is found in the 14th Report of the U. S. Bureau of Ethnology. Thevet's figure of the bison and Cleza de Leon's rough woodcut of one of the llama group, are reproduced in Winsor's *Narrative and Critical History of America*. A great deal of historical matter relating to the bison has been brought together by Dr. J. A. Allen.

article,¹ reproduce a "Figure of a Beaver from the earliest known Monograph — 1685." But the animal there shown is the European beaver, and this species, *Castor fiber*, was first figured by Johannis von Cube at the end of the fifteenth century in his curious "*Hortus Sanitatis*," whose illustration is reproduced herewith, and next after him by Rondelet in 1553. Rondelet's figure is copied by Conrad Gesner in the various editions and translations of his encyclopedic works.²

Prior to the 18th century no single work anywhere appeared on North American plants and animals, corresponding in character to the monumental achievement of Marcgrav and Piso (1648) on Brazil. A search among the writings of early voyagers and travelers, however, both French and English, is rewarded by the discovery of many surprisingly accurate observations. Numerous authors might be mentioned in this connection, but it will suffice to name but one or two: Captain John Smith's *Description of Virginia* (in *Purchas his Pilgrimes*, vol. iv, 1625-26),

and John Josselyn's *New England's Rarities Discovered* (1672). The latter has been twice reprinted. From the former we may give in closing a short specimen extract, selected at random:

"Of beasts the chiefe are Deare, nothing differing from ours. In the Desarts towards the heads of the Rivers, there are many, but amongst the Rivers few. There is a beast they call *Arongcum*, much like a Badger, but useth to live on trees as Squirrels doe. Their Squirrels, some are neere as great as our smallest sort of wilde Rabbits, some blackish or blacke and white, but the most are gray. A small beast they have, they call *Assapanick*, but we will call them flying Squirrels, because spreading their legs, and so stretching the largenesse of their skinned, they that have been seene to flie thirtie or fortie yards. An Opossum hath head like a Swine, and a taile like a Rat, and is of the bignesse of a Cat. Under her belly she hath a bag, wherein she lodgeth, carrieth, and suckleth her young. *Mussascus*, is a beast of the forme and nature of our water Rats, but many of them smell exceedingly strongly of Muske. Their Hares are no bigger than our Conies, and few of them to be found.

Their Beares are verie little in comparison of those of Muscouin and Tartaris. The Beaver is as big as an ordinarie great Dog, but his legs exceeding short. His fore feet like a Dogs, his hinder feet like a Swans. His taile somewhat like the forme of a Racket bare without haire, which to eate the Sauages esteeme a great delicate. They have many Otters, which as the Beavers they take with snares, and esteeme the skins great ornaments and of all those beasts they use to feede when they catch them.

Of Fish, we are best acquainted with Sturgeon, Grampus, Porpus, Seales, Sting-raies, whose tailles are very dangerous, Bretts, Mulletts, white Salmonds, Trowts, Soles, Plaice, Herrings, Conyfish, Rockfish, Eels, Lampreys, Catfish, Shades, Perch of three sorts, Crabs, Shrimps, Creuses, Oysters, Cocles and Muscles. But the most strange Fish is a small one, so like the picture of Saint George his Dragon, as possible can be, except his legges and wings, and the Todefish, which will swell till it be like to burst, when it cometh into the aire.

¹ *Amer. Mus. Journal*, March, 1913. The "earliest known Monograph" therein referred to is one entitled *Castorologia*, written by Johann Marius, a physician of Ulm, and republished by Johann Francus in 1685. It is reviewed in *Philos. Trans. Roy. Soc.* for the same year, vol. xv, p. 1249.

² Among Old World animals figured by Gesner it may be noted that the one given of the ichenumon is taken from an ancient manuscript of Opplan. The earliest printed figure of the giraffe is found in the *Opusculum* of Bernard de Breydenbach (Mainz, 1486 and 1502). This and other African mammals are shown in maps of much earlier date, as for instance, the Hereford and Ebstorf maps of 1280. Otto Keller, in his "*Antike Tierwelt*" (1909), gives an outline figure of the giraffe after a mural painting in the Villa Pamfilii, Rome. Far more ancient, dating back to the very dawn of history, is the Egyptian hunting scene showing the giraffe, lop-eared hound and other animals, which is reproduced by Quibell in his memoir on the Exploration of Hierakonpolis (1902).



*Through courtesy of
E. P. Dutton and Company*

THE AUTHOR OF "WILD BIRD GUESTS" ENTERTAINING
A FRIENDLY CHICKADEE

A VALUABLE NEW BIRD BOOK¹

By T. Gilbert Pearson

THIS is one of those books, too rare in our libraries and always noteworthy, in which the author writes from actual experience. It tells us what he has really done, and what he knows because he has tested his knowledge — a practical book in the strictest definition of the term. Mr. Baynes for many years has been celebrated among bird lovers for his extraordinary ability in making friends with wild birds, and for the ingenious and highly successful devices by which he has induced them to become his guests at his home in a New Hampshire village. Birds not only visit his garden as they do other places where they have ordinary privileges, but they also stay there, get acquainted with the owner and his family, and acquire and exhibit a confidence that seems marvelous to outsiders. Everyone who sees this desires to know how he does it; and the book is in large measure devoted to such explanation, and to a description of the various best ways to invite and to entertain his "guests." Hence it abounds in practical descriptions, with diagrams and photographs as helpful illustrations of the various forms of nesting-boxes, shelters, feeding-stations, drinking-fountains, bird baths and the like, that he has found most successful. His success however implies an intimate acquaintance with the nature and habits of his winged visitors — their several temperaments, foods, breeding habits, enemies and prejudices; and these he communicates freely for the reader's aid.

One feels as he reads the successively interesting pages, that Mr. Baynes is also communicating somewhat of the affection, and the untiring enthusiasm,

with which he has studied and wooed the birds. This enthusiasm is well known to the thousands of persons who have heard him lecture on birds, and it is not surprising to learn that he has long conducted a model bird club in his home town, at Meriden, New Hampshire, and has been the founder of scores of bird-study and bird-protection clubs in all parts of the country. This matter forms an important part of his book. He tells us why every community should have a bird club and how to set it going and keep it going.

The bird club he considers very important because the most serious enemy of the birds is man, and the most serious factor of man's enmity is ignorance. If it were known more widely and generally what this country has already lost and is yearly losing in losing its birds, what the people themselves and their children are daily losing, there is hardly a man, woman or child in the United States who would not be coöperating eagerly in the movement for bird conservation. How many people know that a conservative estimate of the birds killed by domestic cats each year, in Massachusetts only, is 700,000; that there is much more "sport" to be had in gaining the friendship of the birds than in hunting them, and that the actual need of our wild birds for suitable nesting places and for food in winter, is very imperative and very easily supplied? Mr. Baynes tells of these things in interesting detail, and then he says to his readers in big letters, "If there is not already a bird club in your neighborhood, organize a bird club!"

Altogether *Wild Bird Guests* is a book that should be in the hands of every ornithologist and conservationist; as well as on the shelves of every school library.

¹ WILD BIRD GUESTS, HOW TO ENTERTAIN THEM. By Ernest Harold Baynes. E. P. Dutton and Company. New York City.

FRAGMENTS OF SPIDER LORE

By Frank E. Lutz

ARACHNIDA, the scientific name of spiders and their relatives is derived from that of a character in Grecian mythology. According to Ovid, Arachne was a mortal who was so skilled in weaving that she ventured to challenge Athena. When Athena saw that Arachne's work was without blemish she destroyed it. Arachne was driven by grief to hang herself, whereupon Athena changed her into a spider and the rope became a cobweb.

Origin of Spiders

It is said in the sacred writings of ancient India, that a large spider was the originator of the universe. From her glands she wove the web of which we inhabit a part and even now she sits in its center directing its motion. At her pleasure she will consume it, as many of the spiders about us do their webs, and may then spin a new universe. It is worth noting that the same idea occurred in the folk lore of certain American Indian tribes and is also found in that of Guinea.

Spiders did not hold so exalted a station with all people. The idea was current in many parts of the world that they have their origin in putrefaction. Moufet proved this as follows: "It is manifest that spiders are bred of some aëreal seeds putrefied, from filth and corruption, because that the newest houses the first day they are whited will have both spiders and cobwebs in them." His daughter was doubtless the heroine of the nursery rhyme:

Little Miss Moufet sat on a tuffet
Eating her curds and whey
There came a great spider
And sat down beside her
And frightened Miss Moufet away.

Spiders in the Bible

There are three fairly well-known Biblical passages concerning spiders. Agur (Proverbs XXX, 28) includes the spider that "taketh hold with her hands and is in kings' palaces" among the four things which are little but exceeding wise, and the frail spider's web is a symbol of the hypocrite's hope (Job VIII, 14) as well as of the disobedient Jews' works (Isaiah LIX, 5).

Spiders in History

If we may believe legends, Mohammed, St. Felix of Nola and other victims of pursuit have been saved by spiders spinning webs over the entrances to their hiding places. The pursuers, seeing the webs, decided that no one had passed that way and neglected to look.

The fortunes of Robert Bruce were at low ebb and he lay, discouraged, gazing at the cobwebs on the rafters. A spider, after vainly trying twelve times to swing itself by its thread from one beam to another, succeeded on the thirteenth attempt. "The thirteenth time," shouted Bruce, "I accept it as a lesson not to despond under difficulties, and shall once more venture my life in the struggle for the independence of my country." He won.

Perhaps not much more legendary than these is the story that the spiders in the temple of Ceres Thesmophoros wove white webs when the Theban army was to be victorious, but black ones, signifying defeat, when Alexander made his attack.

Spiders as Weather Prophets

During his imprisonment at Utrecht, Quatremer Disjonval observed the relation between changes in the weather and the habits of spiders. When the French invaded Holland in 1794 by crossing the water barriers on ice, Disjonval hoped to be released. An unexpected thaw came in December and the French were about to withdraw but, as Disjonval's spiders predicted a return of cold weather he got word to the French general to wait. This was done; the cold came and the French were able to move even their heaviest artillery and to take Utrecht.

Some of the ideas on this subject are as follows: if the weather is to be rough the threads which support the web are unusually short. Before a rain spiders are indolent. If they are active during a rain fair weather will quickly follow. If spiders make changes in their webs before 7 P. M. the night will be clear and pleasant.

Spiders as Omens of Luck

In Maryland it is said that if you kill a spider which gets on your clothing you destroy

the presents it is weaving for you. A seventeenth century writer puts it as follows: "When a spider is found upon your clothes, we used to say some money is coming toward us. The moral is this: such who imitate the industry of that contemptible creature may, by God's blessing, weave themselves into wealth and procure a plentiful estate."

Instead of killing them you may throw them over your left shoulder if you wish good luck. If you feel that you must kill a spider that has taken up its abode in your house, carry it outside for its execution; otherwise you will be "pulling down your house." If you kill a spider crossing your path you will have bad luck. If a white spider drops in front of you, you will soon see a dear friend; if a black one does the same, you will meet an enemy. In the Netherlands a spider seen in the morning forebodes good luck; in the afternoon bad luck.

Spiders and Music

The following is from the *Anthologia Borealis et Australis*

I hailed thee, friendly spider, who hadst wove
Thy mazy net on yonder mouldering raft;
Would that the cleanlie housemaid's foot had left
Thee tarrying here, nor took thy life away;
For thou, from out this seare old ceiling's cleft,
Came down each morn to hede my plaintive lay;
Joying like me to heare sweete musick play,
Werwith I'd feil beguile the dull, dark, lingering day.

It is said that when the young ladies in a certain English school sang at morning and evening prayers spiders always came out of their hiding places and ran about the floor or suspended themselves from the ceiling.

Before the French author, Pellisson, was converted to Catholicism he was imprisoned in the Bastille. There he fed a spider while his cell-mate played a bagpipe. The spider came to associate the music with food and finally could be called to any part of the cell by blowing on the bagpipe. The sequel to the story is that the governor of the Bastille, hearing that his prisoners had found a pleasure in their confinement asked for a demonstration. When the spider came out he crushed it with his foot.

There are several similar stories. Another from the time of Louis XIV is that Lanzun, during one of his imprisonments trained a spider to come for food when he called it. The interesting part here is that the spider

not only associated sound with food but distinguished between sounds, for when others tried to imitate Lanzun's voice the spider refused to come.

Poisonous Spiders

All spiders are poisonous but there are very few which injure man. This is partly due to lack of inclination and partly to inability to pierce the human skin. However, fear of spiders is almost universal. Sometimes this fear amounts to a mania, the victim going into hysterics at the mere sight of one of them.

The fumes from burning spiders are alleged to cause faintness, cold sweats, vomiting and finally death. Some monks in Florence are reported to have died from drinking wine in which a spider had fallen. Of course the tragedy was attributed to the spider. On the other hand, Conradus, Bishop of Constance, swallowed a spider which had fallen into sacramental wine and suffered no ill effects.

The bite of a large spider — any large spider is commonly called a tarantula — is said to cause the victim to "make a thousand different gestures in a moment; for they weep, dance, tremble, laugh, grow pale, cry, swoon away and after a few days of torment expire, if they be not assisted in time." Music is considered to be an antidote.

From the *Treasury of Ancient and Modern Times* (1619) we learn that "Alexander Alexandrinus proceedeth farther, affirming that he beheld one wounded by this Spider, to dance and leape about incessantly, and the Musicians (finding themselves wearied) gave over playing; whereupon, the poore offended dancer, hauing vtterly lost all his forces, fell downe on the ground, as if he had bene dead. The Musicians no sooner began to play againe, but hee returned to himselfe, and mounting vp vpon his feet, danced againe as lustily as formerly hee had done, and so continued dancing still, til hee found the harme asswaged, and himselfe entirely recovered."

It has also been said that if a wasp has been bitten by a spider and lively music be played, both the wasp and the spider will begin to dance. The same has been said of a bitten chicken. On the other hand if the spider concerned be killed, dancing will stop even in the case of human beings.

On account of these ideas a certain kind of hysterical dance is called the Tarantula.

Italian beggars sometimes claim to have been bitten and solicit alms while in a dancing fit.

Spiders as Medicine

Cobwebs are still used to stop bleeding, a thing which Bottom had in mind when he said to the fairy Cobweb "I shall desire of you more acquaintance, good master Cobweb. If I cut my finger, I shall make bold with you." Ben Jonson said that a certain penurious individual "sweeps down no cobwebs here but sells 'em for cut fingers."

Spiders' webs have been taken internally for ague. Chapman's *Materia Medica* (1824) recommends doses of five grains of spiders' web, repeated every fourth or fifth hour for "obstinate intermittents, paroxysms of hectic, morbid vigilance from excessive nervous mobility, irritations of the system from many causes especially when connected with protracted coughs and other chronic pectoral affections."

If cobwebs be burned on a wart it will be rooted out and never grow again. Pliny states that cobwebs, especially the part which forms the spider's retreat is useful when applied to the forehead as a cure for watery eyes. The web must be taken and put on by a boy who has not reached puberty, who must not show himself to the patient for three days, and, furthermore, neither he nor the patient may touch the ground with bare feet during this time. He also recommends cobwebs moistened with oil and vinegar for cranial fractures.

The spiders themselves seem to have been very efficacious. One sewed up in a rag or enclosed between two nutshells and worn around the neck will charm away ague. It should also be applied to the wrist or temples in the case of bad fevers. If a spider be taken when neither sun nor moon is shining and the hind legs be pulled off and wrapped in deer's skin, the combination will, according to some, relieve gout. Mufet remarked that "we finde those people to be free from the govt of hands or feet (which few medicaments can doe) in whose houses the Spiders breed much, and doth beautifie them with her tapestry and hangings."

Pliny gives uses for spiders as well as for their webs. The thick pulp of a spider's body, mixed with oil of roses, makes an ear lotion. Among the best remedies for spider bites are spiders left to putrify in oil.

Homeopathic treatment seems to have been much favored in cases of spider bites. Collections of dead spiders have been made because if a person bitten by a spider look at another specimen of the same species he will be cured. Dried spiders have been taken internally for the same purpose.

Spiders as Food

It seems that not every one is afraid of spiders. Lande, the French astronomer, proved by eating spiders as delicacies that he could raise himself above dislikes and prejudices. Spiders were eaten by the aborigines of America and Australia. A quotation from Moliere's *Travels in Africa* says that the people of Maniana "eat spiders, beetles and old men."

Doubtless quite a list could be made of uncivilized tribes that eat spiders and there is a number of recorded instances of more advanced persons who, like Lande have acquired the habit. One is given in verse:

How early Genius shows itself at times,
Thus Pope, the prince of poets, lapsed in rhymes,
And our Sir Joshua Banks, most strange to utter,
To whom each cockroach-eater is a fool,
Did, when a very little boy at school,
Eat Spiders, spread upon his bread and butter.

Economic Value of Spiders

It is undoubtedly true that spiders catch and kill many injurious insects. In the fields good insects suffer with the bad, but as few good insects find their way into our houses the house spiders are almost entirely beneficial. However, since spiders are not encouraged to live in our houses it is doubtful whether the group as a whole helps us greatly in our fight against injurious insects.

The strong supporting threads of cobwebs have been much used in telescopes for the purpose of making fine lines appear in the field of vision.

Silk spun by spiders to cover their eggs has been woven into cloth. It is said that the fabric is so transparent that a young lady was once reproved by her father for the immodesty of her costume although she wore seven thicknesses of it. Since it requires more than half a million egg-masses to yield a pound of silk the industry does not promise to become commercially profitable.

CORYTHOSAURUS, THE NEW DUCK-BILLED DINOSAUR

By W. D. Matthew and Barnum Brown

THE American Museum of Natural History has recently added a remarkable specimen to the series of skeletons in the Dinosaur hall. It is a crested, duck-billed dinosaur, unusually complete and in many ways unique; for not only is the bony skeleton and the skin impression surrounding the body preserved, but underneath the skin may be traced at least four distinct sets of muscles, showing definite origin and insertion of each series.

Evidently the body had floated along some prehistoric beach where, caught in quiet water, it was stranded lying on its left side on a bed of plants the carbonaceous remains of which may still be seen, accounting for the indefinite impression of a large part of the skin on the left side. *Unio* shells were scattered all about; other trachodont bones and a water turtle lay on the top of the tail, and over the body were deposited three large folds of sandstone, the cross-bedded layers showing deposits by water currents from different directions. [On this upper right side the fine sandy silt preserved a better impression of the skin, where it was not torn away, and the outline of the underlying bony skeleton is distinct.

This skeleton is complete except for the fore limbs, most of which are missing, but the bones are mostly concealed under the skin. The texture of the skin is not as well preserved as in the "dinosaur mummy" also exhibited in this hall, but shows a similar pattern of small, tessellated scales, not overlapping like those of a lizard or snake, but grouped in patterns and of various sizes and arrangement in different parts of the body. The double series of slender, rodlike, calcified tendons along the back are very clearly shown; these are tendons of part of the great muscles that moved the backbone in a vertical plane.

It is very rarely that any portion of an extinct animal other than the skeleton is preserved. The softer parts almost always decay and disappear without leaving a trace behind, long before petrefaction sets in. Usually all that we know of an extinct animal is derived from the study of its skeleton and of its bony armor, if it had any. Any trace of skin or other soft parts is naturally a great help in

attempting to reconstruct its external form and in determining its habits. Such evidence is especially welcome in connection with dinosaurs, animals millions of years old and very different from any now living. Delicate and often obscure as are the skin impressions, they have been noticed and recorded on various fossil skeletons; but it is only within the last few years that the development of the technique of excavating and preparing such specimens has made it possible to save them entire. The two dinosaur skeletons in this hall are believed to be the only ones with the skin extensively preserved shown in any museum. A third specimen has been secured by the Senckenberg Museum, Frankfurt-am-Main, but is not yet completely prepared for exhibition.

The new acquisition in the American Museum was found in 1912 by a Museum expedition in charge of Mr. Barnum Brown, in the Belly River cretaceous rocks exposed at Steveville, on the fossil-famous Red Deer River of Alberta, Canada. It was taken up in large blocks, united in the laboratory just as found, and raised to a vertical position so that both sides may be seen, thus assuming a pose the animal may well have taken while swimming. The missing parts of the front limbs have been painted on the matrix from a second skeleton of the same size found last year, as also the tip of the tail, which was weathered out and partly missing.

The preparation of the skeleton was a slow and difficult process, requiring great skill and patience on the part both of collector and preparator. It was so fragile and heavy in some parts that it was necessary to support it by a perfect network of steel rods perforating the blocks in every direction, and in other parts so extremely thin and delicate that the least pressure would have shattered or damaged it beyond repair. Add to this the difficulty of removing the rock matrix, often quite hard, from the delicate film which represents the skin, and cleaning it so as to show the structure; of cleaning and mending the innumerable breaks and joints caused by the earth-jars and movements in the rocks during the millions of years since it was buried; and it will not appear surprising that two years

time was taken by the preparators before the work was completed. The preparation work was done chiefly by Mr. Otto Falkenbach.

The animal is a new kind of duck-billed dinosaur, related to the *Trachodon* and *Saurolophus* of which skeletons are shown elsewhere in the hall, but the distinguishing and striking feature of this new animal is the skull, on account of which it is given the name *Corythosaurus* (meaning Corinthian-helmeted saurian). The remarkable crest on the top of the skull probably supported a flexible, ornamental membrane as seen in some modern lizards. The rest of the skeleton is in a general way like that of *Trachodon* and other members of the family of dinosaurs, the distinctive feature being the development of the pelvis and the proportion of the limbs.

The trachodonts were a great family of herbivorous dinosaurs numerous in genera and species and represented by great numbers of individuals in late Upper Cretaceous times. The body was covered by tuberculated skin of distinct pattern in the different genera and all of these duck-billed dinosaurs seem to have been good swimmers, if we may judge

by the vertically flattened tail characteristic of swimming reptiles. Probably they escaped from their enemies in that way, for they were without means of offense or defense, bearing neither horns nor armor plates like their contemporaries the ceratopsians and ankylosaurs.

The limbs and feet were adapted for walking or running, and in swimming would probably be trailed behind or pressed closely against the sides. The modern iguanas of the Galapagos Islands swim in this way, and the position in which the *Corythosaurus* skeleton lies in the rock is strikingly suggestive of a swimming pose; although it must be remembered that when discovered the specimen lay flat on its side, the carcass crushed to a thin plate by the overwhelming weight of thousands of feet of mud and sand sediment which, during the millions of years since it was deposited, had turned into rock. The length of the specimen is eighteen feet, and startling indeed must have been the appearance of *Corythosaurus* as it rose from the water to its full height with helmet raised cap-a-pie like a knight of old.

MUSEUM NOTES

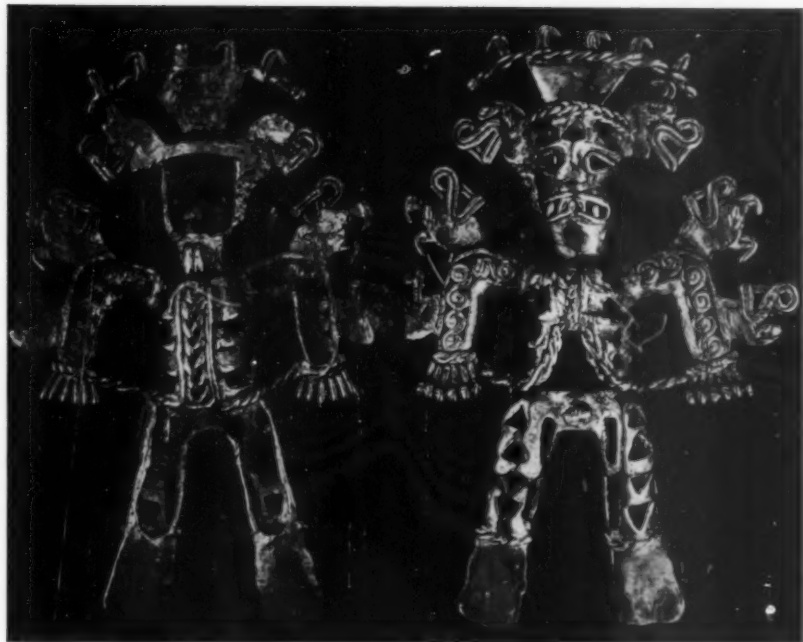
SINCE the last issue of the JOURNAL the following persons have become members of the Museum:

Life Members, MRS. E. C. CONVERSE, PROFESSOR RAYMOND C. OSBURN and MESSRS. B. PRESTON CLARK, ALFRED HAFNER and HENRY C. KELSEY;

Annual Members, MRS. LOUIS ANSBACHER, MRS. LEO ARNSTEIN, MRS. F. O. AYRES, MRS. A. BATTIN, MRS. JANET BURCHELL, MRS. F. S. COOLIDGE, MRS. JONATHAN H. CRANE, MRS. J. C. DESOLA, MRS. ROSE FISHER, MRS. SAMUEL FLOERSHEIMER, MRS. THOMAS B. M. GATES, MRS. JAMES GROSVENOR, MRS. BENJAMIN GUINNESS, MRS. VICTOR GUINZBURG, MRS. FREDERICK C. HICKS, MRS. AUGUSTUS JAY, MRS. HARRY T. JOHNSON, MRS. W. N. KERNAN, MRS. JOHN B. MOTT, MRS. JOHN W. NUTE, MRS. WHEELER H. PECKHAM, MRS. CLARENCE PORTER, MRS. SAMUEL STIEFEL, MRS. SAMUEL SWIFT, MISSES ALICE H. ANNAN, MARY T. BRADLEY, GLADYS CROMWELL, MADELEINE GELSHENEN, AUGUSTA BORLAND GREENE, ELIZABETH HANNA, H.

MAUD HENRY and NINA RHOADES, DR. T. PASSMORE BERENS, DR. FENTON B. TURCK, DR. ALVIN M. PAPPENHEIMER and MESSRS. GEORGE D. ARTHUR, WILLIAM B. BRISTOW, W. H. CHESEBROUGH, WILLIAM DETTE, HARRIS FAHNESTOCK, ROBERT EDISON FULTON, ABRAHAM L. GOLDSTONE, OGDEN H. HAMMOND, FREDERICK W. HERZ, MAX HERZOG, M. B. HILLEGAS, H. M. KAUFMANN, MAURICE MARKS, HOFFMAN NICKERSON, J. PARMLEY PARET, FREDERICK SNARE, J. E. STERRETT, FELIX A. VOGEL, GEORGE A. VONDERMUHLL, LOUIS T. WATSON and MASTER EUGENE DUBOIS.

At a meeting of the Executive Committee of the American Museum on November 17, Mr. B. Preston Clark was elected a life member in consideration of his generosity in bearing the expense of Mr. F. A. Watson's entomological field trip to Santo Domingo last spring. Mr. Clark is himself an entomologist and has presented to the Museum numerous rare species of *Sphingidae*. Dr. Raymond C. Osburn, formerly of the New



Ancient gold work from Panama recently purchased for the Museum

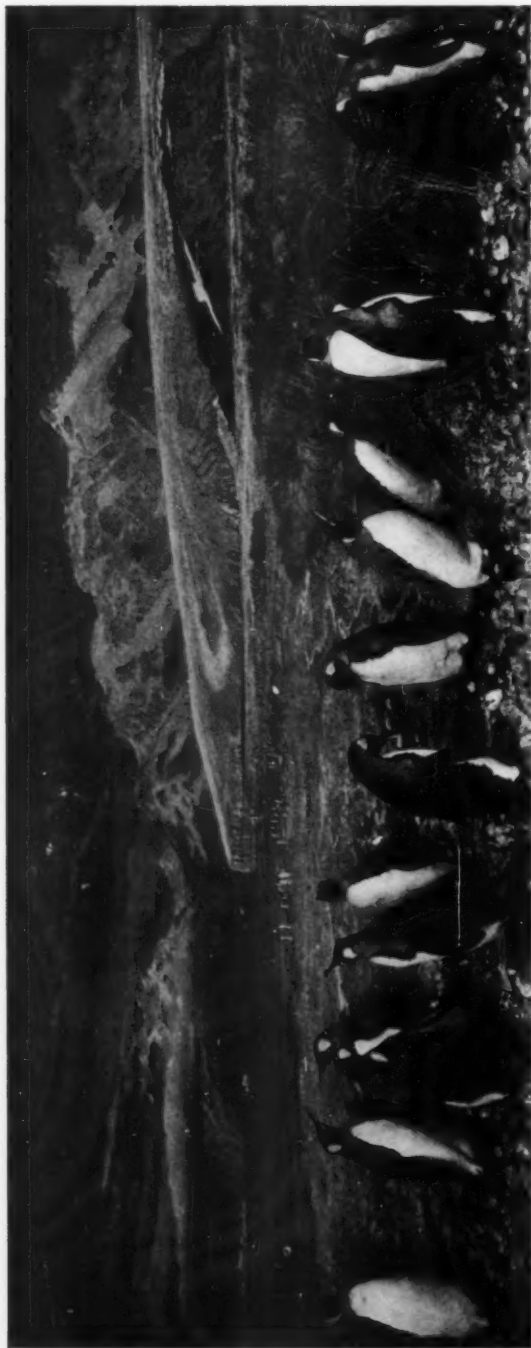
York Aquarium, and now professor of biology at the Connecticut College for Women, New London, has also been made a life member in appreciation of his gratuitous services to the Museum in connection with the collections of the Townsend "Albatross" expedition.

FIVE pieces of ancient gold work from the district of Alange, province of Chiriqui, western Panama, have been recently purchased for the Museum. The objects are similar to those in Mr. Keith's collection described in the October number of the JOURNAL, and are all amulets, used as breast ornaments. The finest specimen, illustrated above, is in almost complete relief, and represents a human skeleton, from the arms and head of which project profile heads of the deified crocodile, indicating that the figure is probably that of a god. Another of the specimens represents a deer, and is a characteristic example of the skill in animal modeling attained by the ancient peoples of Panama. The specimens will be found on exhibition in the Mexican hall.

THE Hitchcock Lectures on "Men of the

Old Stone Age, Their Environment, Life and Art," delivered by Prof. Henry Fairfield Osborn at the University of California in February, 1914, have just been published in book form by Charles Scribner's Sons, and constitute a notable addition to the literature of palaeolithic times. The book is lavishly illustrated with numerous reproductions of palaeolithic engravings, carvings, and paintings from caves and rock shelters; original drawings by Messrs. Charles R. Knight and Erwin S. Christman, and charts and cross sections by Dr. Chester A. Reeds. Of special interest are the restorations of the *Pithecanthropus*, Piltown, La Chapelle, and Crô-Magnon men, modeled by Professor J. H. McGregor upon casts of the original fossils. The book will be reviewed in a forthcoming issue of the JOURNAL.

MR. AMOS F. ENO who died on October 21, bequeathed to the American Museum the sum of \$250,000. Mr. Eno was an annual member of the Museum since 1881, and a life member since June, 1905. With the exception of the Jesup bequest this is the largest ever received by the Museum.



A NEW BIRD GROUP IN THE AMERICAN MUSEUM

King penguins on South Georgia Island. In the background is Lucas Glacier, named for the director of the Museum by Mr. Robert C. Murphy on the expedition to South Georgia Island in 1911-12. The birds for the group were mounted by Messrs. Lang and Engel; the background was painted by Mr. Albert Operd

A GROUP of king penguins recently installed in the Museum (central pavilion, second floor) is the first of a series of habitat bird groups of the world, planned by Dr. Chapman to round out the systematic series of birds shown in the adjoining hall. The plan contemplates flooring over the central section to insure the necessary darkness and permit these habitat groups, like those of the birds of North America, to be illuminated entirely by controlled artificial light. This construction at the same time makes provision for groups of monkeys and lemurs on the floor above. The heterogeneous assemblage of animals now in this central section of the second floor is to be variously provided for: the groups of reptiles in a hall in the projected east wing; the seals and sea elephants with other marine mammals in the attached court building, and the Asiatic mammals in a hall of their own. Unfortunately these improvements and changes, long contemplated and planned for, require extensive funds, and the resources of the city for the past three years have not been sufficient to permit the erection of the much needed new wing. Meanwhile, the unsatisfactory condition of the central pavilion is keenly felt by the Museum and it has been necessary to announce by means of labels that various groups are "placed here awaiting the construction of a new wing."

DURING the last six months an entirely new process in taxidermy has been invented and tried out by Mr. Carl E. Akeley of the American Museum. Mr. Akeley's previously worked out processes have hitherto represented the high water mark of attainment in this direction, and although they did not reach his own ideal they came as near it as he thought practice would ever permit. The new idea which came to him last summer however, and which has now been thoroughly tested, produces results which for softness of modeling, accuracy in reproducing the individual animal and degree of permanence, are far ahead of anything heretofore possible, and which are achieved at infinitely less cost of labor, money and time. It is a conservative statement to say that this invention will reduce the cost of the projected new African hall of the Museum by at least one hundred thousand dollars, while the value of the exhibits will be increased to an inestimable degree. Not only

so, but the infinite trouble, worry, and necessity for some compromise involved in the mounting of specimens hitherto is reduced by this method quite eighty-five per cent. Two buffalo heads have already been mounted by the new process and a lion's head is now in hand.

IN addition to the splendid collection of 20,000 vertebrate and 140,000 invertebrate specimens brought from Africa by the Lang-Chapin expedition, the evidence in the shape of photographs by Mr. Lang and accurate colored drawings by Mr. Chapin is unusually varied and complete. No less than 7000 photographs help to set forth the animal life of the Congo, as well as the industries, customs, art, ceremonies, amusements and mode of life of the natives; while the ethnological value of the work is further supplemented by some seventy casts of heads which Mr. Lang was able to make through the consent of a tribe of Pygmies.

ON Friday evening, December 17, Mr. Ernest Harold Baynes will lecture at the American Museum to the adult blind of New York City and Brooklyn on "Wild Animal Friends of Mine." Mr. Baynes is widely known as a friend of the birds; this lecture will tell how he has improved acquaintance also with the fox, skunk, bear, wolf and other creatures. Doors will be open at 7.30, to permit of inspection by the blind of specimens of the animals, the lecture following at 8.15, P. M.

The lecture to the blind on November 19, attracted over three hundred blind persons and their attendants and acknowledgment is due to the excellent work of the boy scouts in this connection, who for some time past have conveyed to and from the lectures such of the blind as were in need of an attendant.

ONE of the interesting papers read at the recent meeting of the National Academy of Sciences at the Museum was by Professor Herbert S. Jennings on "Can we Observe Organic Evolution in Progress?"

In most breeding experiments the original stock is usually not a "pure line," but a mixture containing various strains due to the fact that each individual is the offspring of two parents, each with more or less different hereditary tendencies. Breeding experiments on such "biparental" organisms

having failed to yield a rigid theoretical proof of evolution by selection, many similar experiments had been made with the same object on certain organisms which have only one parent; but in most cases these "uniparental" strains are just as resistant to the process of selection with reference to given characters as are biparental races. Professor Jennings had succeeded however, in getting positive results from selective processes in the case of certain kinds of *Dictyostelium*, uniparental amoeba-like animals. Starting with a single individual, he had by selecting for large size, been able in the course of many generations to increase materially the size of the individuals; and similarly by segregating in each generation the individuals having the largest number of spines, he had succeeded in materially increasing the number of spines. Even after selection ceased the progeny of the modified races retained the effects of the selective process.

A LARGE and representative collection of invertebrate fossils from Porto Rico was secured by Messrs. Chester A. Reeds and Prentice B. Hill in the work carried on by them the past summer in connection with the Porto Rico survey. In addition Dr. Reeds brought back a fairly well-preserved jaw and several parts of ribs representative of fossil mammals of the Tertiary formations. Tertiary mammals are almost unknown in the West Indies. The only described specimen is the skull of a very interesting primitive Sirenian, related to the manatee and dugong found in Jamaica and named *Prorastomus* by Professor Owen many years ago. Dr. Reeds' specimens are probably Sirenian—the jaw certainly is—but differ from *Prorastomus*. It may help to clear up some of the puzzling problems in the evolution of the original group, an offshoot, as now appears, of the same primitive stock that gave rise to the elephants and mastodons. It is of interest also to note that certain bones from the Porto Rico Tertiary in the collection of Signor Narcisso Rabell Cabrero, San Sebastian, appear also to be Sirenian. No land mammals have been found in any Tertiary formation in the West Indies; this however is to be expected since these formations are all marine or littoral, and the discovery of land animals in them would not be expected unless as a rare accident.

THE large collection of prehistoric pottery collected by Mr. Algot Lange on the island of Marajo has been acquired by the American Museum. Marajo Island in the mouth of the Amazon River is 165 miles long by 120 wide, or considerably larger than the island of Jamaica, and belongs to Brazil. A collection of some two thousand pieces comes from Pacoval Island in Lake Arary, the source of the Arary River. Mr. Lange described the little island of Pacoval as a veritable archaeological mine. Fragments of pottery cover the ground and everywhere the earth is mixed with pottery ranging in size from minute pieces to vessels weighing as much as twenty-five pounds. Nothing is known of the makers of this ware. Who they were or where they came from is at present a mystery, but it is hoped that a study of the unique and beautiful decorations on the pottery will afford some information on the point.

DR. CLARK WISSLER and Dr. Robert H. Lowie, of the American Museum of Natural History, have been appointed delegates from the New York Academy of Sciences to the Nineteenth International Congress of Americanists which meets in Washington at the end of December.

DR. HENRY E. CRAMPTON, curator of invertebrate zoölogy at the American Museum, delivered the oration before the Phi Beta Kappa Association of Pennsylvania on December 4. Dr. Crampton took for his subject "Science, Culture and Human Duty."

THE annual meeting and dinner of the New York Academy of Sciences will be held December 20. The retiring president, Dr. George F. Kunz, will deliver the address of the occasion.

MR. M. P. SKINNER, a member of the American Museum, has presented to the institution some valuable motion-picture films and photographs of animals of the Yellowstone Park, obtained during his twenty years experience in that region.

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